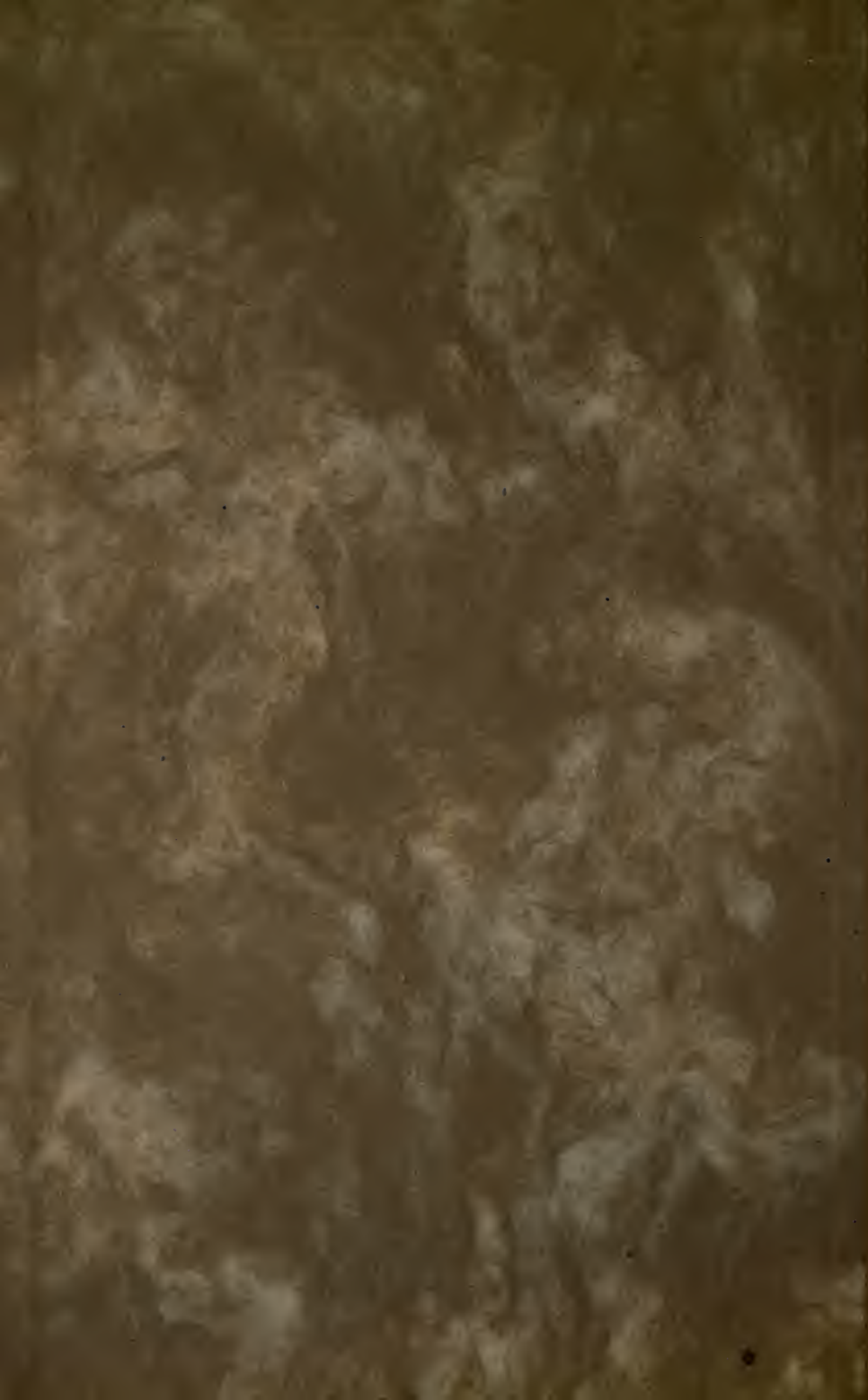




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THE ASCLEPIAD.

A Book of Original Research and Observation

IN THE

SCIENCE, ART, AND LITERATURE OF MEDICINE,
PREVENTIVE AND CURATIVE.

SECOND SERIES.

1895.

BY

Sir Benjamin Ward Richardson, M.D., F.R.S.

VOLUME XI.

TERAR DUM PROSIM.

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TO
NATHAN S. DAVIS, M.D.,
OF CHICAGO,
WHO HAS LIVED TO SEE A GREAT CITY
RISE BEFORE HIM,
AND WHO HAS BECOME A LEADER OF THE PROFESSION
OF MEDICINE,
THIS ELEVENTH VOLUME OF THE "ASCLEPIAD"
IS AFFECTIONATELY DEDICATED.

PREFACE

TO THE ELEVENTH VOLUME OF THE "ASCLEPIAD."

THE eleventh volume of the ASCLEPIAD resembles its predecessors, except that the parts of it have been issued at rather longer intervals of time. The fact is, that during its preparation unusual labour in hospital practice, together with original researches on nervous matter, which would not admit of hasty observation, have been sources of delay.

In the way of compensation, to some extent, for the loss of time, I have added to the four parts that have been published several additional pages, which will, I trust, be accepted. I also trust that the new pages of selected readings, promised in last volume, will meet with the approval of the many who assure me that they keep the ASCLEPIAD as one of their treasures.

BENJAMIN WARD RICHARDSON.

25, MANCHESTER SQUARE, LONDON, W.,

Christmas Day, 1895.

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THE TREATMENT OF DISEASE WITHOUT ALCOHOL.

(DRAWN FROM FIVE HUNDRED CASES.)

Report No. II.

*A REVIEW OF MEDICAL PRACTICE IN THE WARDS OF
THE LONDON TEMPERANCE HOSPITAL FROM THE
END OF 1892 TO MARCH 31ST, 1894. FIVE HUNDRED
CASES.*

IN No. 37 of the ASCLEPIAD—the first part of Volume X.—I reported on two hundred cases of disease treated under my care in the wards of the Temperance Hospital, from the time when I commenced to be physician there,—April 1892. Since the close of that report five hundred new cases have come under my care, on which I am now about to report, repeating at once the statement that in not one instance has alcohol been prescribed.

For the sake of uniformity I shall take up the diseases in classes precisely as in the last report, beginning with those of the respiratory system.

GROUPS OR CLASSES OF DISEASES UNDER TREATMENT.

DISEASES OF THE RESPIRATORY SYSTEM.

The diseases affecting the respiratory system included 39 cases of acute pneumonia and pneumonia with

complications; 9 of bronchial pneumonia; 25 of bronchitis; 7 of bronchitis and emphysema; 2 of emphysema; 5 of pleurisy; 6 of pleurisy with effusion; 1 of emphysema; 3 of hydrothorax; 4 of capillary bronchitis; 3 of incipient phthisis; 15 of phthisis in late stages; 3 of advanced phthisis; 5 of pulmonary catarrh; 1 of bronchorrhœa; 1 of asthma; 1 of laryngismus stridulus; 1 of pertussis; and 1 of pleurodynia. *In all* 132.

DISEASES OF THE CIRCULATORY ORGANS.

Mitral incompetence, 14; mitral stenosis, 12; mitral disease, 2; aortic regurgitation, 1; aortic stenosis, 1; aortic and mitral stenosis, 1; aortic and mitral disease, 4; pulmonary stenosis, 3; advanced valvular disease, mitral and semi-lunar, 1; rheumatic endocarditis, 2; endo- and pericarditis, 1; aortic aneurism, 2; subclavian aneurism, 1; fatty degeneration of the heart, 2; thrombosis, 4; embolism, 1; syncope, 1. *In all* 53.

DISEASES OF THE ALIMENTARY SYSTEM.

Gastritis, 5; gastro enteritis, 3; gastric ulcer, 8; dyspepsia, 10; infantile diarrhœa, 6; diarrhœa, 1; constipation, 3; bilious dyspepsia, 2; dysentery, 1; intussusception, 1; perityphlitis, 2; purulent peritonitis, 1; pelvic cellulitis, 1; oxyuris verm., 1; ascaris lumb., 1; cirrhosis of liver, 2; catarrhal jaundice, 2; carcinoma of liver, 2; abdominal malignant disease, 1; tabes mesenterica, 1. *In all* 54.

DISEASES OF THE NERVOUS SYSTEM.

Hysteria, 5; chorea, 8; meningitis, 3; tubercular meningitis, 8; myelitis, 1; peripheral neuritis, 2; post-paraplegia, 1; post-hemiplegia, 2; dementia, 2; imbecility, 1; general paralysis, 1; delirium tremens, 1;

epilepsy, 1; malingering, 1; hypochondriasis, 1; neurasthenia, 1. *In all* 39.

DISEASES OF THE URINARY SYSTEM.

Acute nephritis, 5; post-scarlatinal nephritis, 1; tubal nephritis, 2; interstitial nephritis, 4; chronic Bright's disease, 4; vesical growth, 1; renal calculus, 1. *In all* 18.

DISEASES OF THE UTERINE SYSTEM.

Retained foetal products, 1; pelvic abscess, 1; parametritis, 2; puerperal mania, 1; dysmenorrhœa, 2; retroversion of uterus, 1; prolapsus of uterus, 1; phlegmasia dolens, 1; ulceration of cervix, 1; endometritis, 2; miscarriages, 2; post-miscarriage, 1. *In all* 16.

ENTERIC FEVER—11 cases.

ACUTE POISONINGS.

By alcohol, 5; paraffin oil, 2; lead, 5. *In all* 12.

RHEUMATIC DISEASES.

Acute uncomplicated rheumatism, 71; chronic rheumatism, 3; rheumatism and endocarditis, 9; rheumatism and pericarditis, 1; muscular rheumatism, 1; rheumatic gout, 1; rheumatoid arthritis, 4; gonorrhœal rheumatism, 1; rheumatic periostitis, 1. *In all* 92.

CUTANEOUS DISEASES.

Eczema, 4; erythema nodosum, 1; furunculi, 1. *In all* 6.

MISCELLANEOUS.

No localised disease (malaise), 10; chlorosis, 5; anæmia, 9; starvation, 2; malnutrition, 1; sloughing

of scrotum, after varicella, 1; bronchocele, 2; syphilis, 2; diphtheria, 3; debility, 1; varicella, 1; measles, 2; febricula, 2; doubtful pertussis, 1; infantile remittent fever, 1; convalescence after measles and other exanthems, 5; influenza, 4; insolation, 1; trachoma, 1; neurosis of superior maxilla with gangrene of lung, 1; rickets, 1; early otitis media, 1; recurrent mammary scirrhus, 1; follicular tonsillitis, 2; general tuberculosis, 6; tubercular peritonitis, 1. *In all* 67.

LEADING RESULTS.

I turn now, as before, to the leading results of practice as they are recorded in our register, dividing the results into four great classes as before:—

1. Cases that have recovered and have been discharged.
2. Cases that have been discharged as relieved.
3. Cases that have been discharged *in statu quo*, or unrelieved.
4. Cases that have died, with *post mortem* notes.

Out of the five hundred cases that have been under my treatment, the results run as follows:—

Recoveries	303	. =	60·6 per cent.
Relieved	121	. =	24·2 „ „
Discharged unrelieved . .	19	. =	3·8 „ „
Died	57	. =	11·4* „ „
	<u>500</u>		<u>100·0</u>

It will be seen from this return, if it be compared with the return on the two hundred cases recorded last year, that the mortality is considerably less; the percentage of mortality in the present report being 11·4 compared with 14·50 previously recorded. This diminution is not due to the circumstance that the cases were of

* The aggregate mortality of the Hospital was 6·2 per cent.

lesser moment, but to the fact that certain cases brought into the hospital in a moribund state and dying within twenty-four hours have, according to acknowledged and correct rule, been excluded from the record.

RESULTS OF TREATMENT.

RECOVERIES.

The same scrupulous care was taken this year as last to exclude every error in diagnosis, and to discharge no case as a recovery until recovery was complete. Three hundred and three recoveries were tabled.

Diseases of the Respiratory System.—These, 132 in number, yielded very satisfactory results. Of 33 cases of acute pneumonia of a severe type, including 9 of broncho-pneumonia, 29 recovered. Of pneumonia attended with complications of a serious character, 1 recovered; and of double pneumonia there was 1 recovery. Of the bronchial cases, 25 in number, and all acute, 24 recovered, and one, developing fever, was sent to the Asylums Board Hospital. The pleurisies did well: there were 5 uncomplicated acute cases, all of which recovered. There were 6 with effusion, 5 of which made good recoveries. Of empyema there was a typical case which recovered; as did a case of hydrothorax. Two cases of capillary bronchitis recovered. Two cases of incipient phthisis, with well-marked symptoms, made good recoveries, and 1 extreme case of laryngismus stridulus did well, and was dismissed quite well.

In all, out of 133 chest cases, each of severe kind, there were 87 recoveries, or at the rate of 65·4 per cent. On the whole, the bronchial cases presented, perhaps, the most striking returns, inasmuch as there was not one fatal case; and 2 cases of incipient phthisis were

remarkable from the satisfactory manner in which they seemed to regain complete health.

Diseases of the Organs of the Circulation.—As is usual in hospital practice, the diseases of the circulatory system being of the chronic, and, as is commonly said, of the incurable kind, receive nothing more than relief. But out of 53 examples of these diseases there were 5 that recovered. One was an instance of mitral obstruction, which seemed at first to offer but little chance of improvement, but ultimately did well, the morbid sounds passing entirely away, and the patient being completely relieved of the symptoms of embarrassment. 2 cases of thrombosis showed also a good recovery, as did 2 cases of what appeared clearly to be obstruction in the cerebral circulation. Another case marked by repeated syncopes was dismissed, recovered.

Diseases affecting the Alimentary System.—The illustrations of alimentary affections presented a goodly return. Five cases of gastritis, 8 cases of gastric ulcer, together with 10 cases of very troublesome dyspepsia, 1 of dysentery, 2 of perityphlitis, and 1 of catarrhal jaundice, all gave complete and rapid recoveries. There were 4 recoveries from infantile diarrhoea, and 2 from extreme constipation. In the treatment of these cases I was specially struck by the great advantages which obviously arose from the entire absence of alcoholic fluids. I was never in my life accustomed to administer alcoholics in gastritis, and in the 5 cases under this head, none of course was given, with results that were extremely satisfactory; but during one period of my life I did administer alcoholics moderately in gastric ulcer, and in certain forms of dyspepsia. All the cases of this kind were now treated without alcohol with the best results. I was particularly struck in regard to the

value of abstinence in the 8 cases of gastric ulcer. The symptoms left no doubt on the mind as to the nature of the disease in every instance. No case on admission was free of the symptom of vomiting, and in 5 the vomiting was severe and attended with much pain. By rest, very careful feeding, and entire abstinence, recovery in each instance followed with a rapidity I have never before witnessed, and this without anything special in the way of medicinal treatment. In the dyspeptic cases the abstinence system seemed to have a like effect for good, and patients who, in the early part of my life, I should certainly have treated with some alcoholic, under the impression of relieving distension or of assisting digestive power, were restored to good health and good digestive condition more quickly than I had expected, under proper foods and slight alterative medicinal treatment. The infantile diarrhoeas, in which I once would have given small quantities of brandy at different stages, got well with singular rapidity. The two patients with perityphlitis afforded many points of interest. One recovered rapidly after passing through an acute stage with high temperature (104° Fahr.). The other, a young man, had several relapses, with much tenderness and enlargement over the cæcum, attended with sleeplessness and considerable pain, which was increased on pressure. At one time in this case I feared the mischief was extending along the small intestine, and there was so much digestive disturbance that food had to be given with the utmost discretion. There were three relapses, but finally recovery set in; and, notwithstanding the occurrence of great prostration, the patient at last advanced speedily towards health, and left the hospital on the list of recoveries.

Diseases of the Nervous System.—In this category

there were 3 excellent recoveries from acute chorea. The subjects were children who came into the hospital in a feeble and dejected state, due, doubtless, to a great extent, to indifferent feeding and neglect, with rheumatic predisposition. They each recovered in a few weeks, and as they were treated medicinally in different ways with much the same effects, I am inclined to think that the comfortable nursing, the warm bed, the careful feeding, and the distraction from poor home-life, had more to do with the benefit obtained than anything derived from medical skill of a purely technical kind. The children improved in their general life, and, with that, the nervous irritability seemed proportionately to pass away. One case of post-paraplegia also recovered, as did one of delirium tremens, and one of hypochondriasis. It has been the common custom to allow to the hypochondriac some degree of stimulant under the idea that it removes the depression, and has a tendency to favour sleep. In this instance no such course being pursued, but a careful diet and regimen being ordered, recovery took place in a shorter period than might have been expected. This tallies with what I have observed in cases of a similar nature in private practice, and with another observation that I have several times made, that the hypochondriac, though he may seem to be for a short time relieved by a stimulant, is always so much more depressed after the effect of the stimulant goes off that more harm than good is the consequence.

Diseases of the Urinary System.—Among diseases of the urinary system attended by recovery was one of acute nephritis and one of post-scarlatinal nephritis. They were both severe, and in the scarlatinal case there were comatose symptoms which for some days were, at intervals, well marked.

Enteric Fever (Typhoid).—Eleven cases of enteric fever came under treatment. They were all typical cases, and five of them were extremely severe and critical. They all recovered within the usual period incident to convalescence, and three of them recovered with more than usual rapidity. In two there was hæmorrhage from the bowels, and in four considerable distension of the peritoneum. There were four relapses, and two with pneumonic complications. As I shall have occasion to speak of these cases in a future essay I need only say of them here that every difficulty was easily met without the administration of a stimulant.*

Acute Poisoning.—Of ten cases of acute poisoning that recovered, 4 were examples of acute poisoning by alcohol, 2 by paraffine, and 4 by lead. The alcoholic cases showed rapid and marked progress, and in one in which degeneration of the tissue appeared to have made much way in a young man, convalescence commenced, I had almost said unexpectedly, and continued until he left the hospital quite well. The poisonings by paraffine were acute and accidental. They were brought originally into the casual ward, but were received into my wards at once. The symptoms were severe, consisting of great pain in the stomach, with attempt to vomit, and considerable prostration, but without anæsthesia. After free emesis and under warmth they rallied, and were discharged quite well after a brief residence. The four cases of lead poisoning were chronic in their nature, presenting the usual symptoms of plumbism. It is difficult to be certain, but it struck me

* These 11 cases added to 5 of last year give a yield of 16 consecutive instances of enteric fever under the non-alcoholic treatment in my wards, with recovery in every case.

that recovery in these instances was favoured by the absence of alcohol.

Diseases of the Uterine System.—Two cases of parametritis, 1 of dysmenorrhœa, 1 of uterine retroversion, 1 of endo-metritis, 1 of miscarriage, and 1 of debility after miscarriage, all did well and were discharged under the recoveries.

Rheumatic Diseases.—The numbers of acute and subacute rheumatic affections admitted in the year were numerous. There were no less than 71 cases, with 69 recoveries and 2 relieved. There were 2 recoveries from chronic rheumatism, 2 from rheumatism complicated with endocarditis, 1 complicated with endocarditis and pericarditis, 1 from muscular rheumatism, and 1 from gonorrhœal rheumatism. As we follow a therapeutical plan in rheumatic fever, which seems in regard to the action of medicines to stand in the true relationship of cause and effect, and as the evidence of that relationship is now becoming considerable, further facts relating to it must be postponed for a special article; but I must express here my strong conviction that no small part of our success in the management of the rheumatic cases has been due to the entire abstinence from alcohol in the course of their treatment.

Cutaneous Diseases.—In six cases of cutaneous disease, 4 of eczema, 1 of erythema nodosum, and 1 of furunculi, there were good and rapid recoveries in every case.

Miscellaneous.—The miscellaneous cases that recovered included two or three deserving of notice. One of these was a case of a child that was brought in during the incubation stage of varicella. The child suffered severely from the disease, and was unfortunately

the cause of conveying the infection to others ; but the most remarkable part of the case was that the little patient suffered also from sloughing of the scrotum, so that the testicles were exposed as the deep sloughs came away. Ultimately the parts closed in, the testicles were re-enclosed, and a very good recovery resulted. There was no assignable cause for the sloughing. The body of the child was fairly nourished, and no local injury accounted for the change. A good recovery occurred in a case of diphtheria. By the rules of the Institution diphtheritic cases are not admitted, but now and then they are brought for admission in the last stages of the disease, and in such imminent danger it is impossible to dismiss them without treatment. The case here referred to was one of this class. The danger of death from obstruction of the respiration was immediate. Tracheotomy was performed, and symptoms of recovery were at once manifested. It seemed also as if the constitutional symptoms were relieved by the act of letting fresh air pass into the lungs, directly, through the tracheal opening, instead of finding its way through the affected nasal cavity. This is not the first case in which, as it seemed to me, the same beneficial effect has been produced by the operation. The recovery was rapid and complete. We had 4 well-marked cases of influenza which come under this division. They were all severe, were treated in the most simple manner medically, but were well sustained by food, and were discharged in the end quite well. There was no evidence of their having communicated the disease to any other subjects. In two instances patients were brought to the Hospital suffering from what is called fever, but fever which took no very definable form, simply a high temperature running up

to four degrees above the natural, with loss of appetite and exhaustion, unaccompanied with rash, eruption, prolonged enteric symptoms, rheumatism, or detectable lung affection. Our predecessors would have called these cases of continued fever. We have returned them as "Febricula" in each case, but they were rather more than that, for in one, at least, the symptoms were exceedingly acute and prolonged, but in none recurrent or remittent. 7 cases of well-marked anæmia recovered well and rapidly, under iron with saline purgatives.

CASES DISCHARGED AS RELIEVED.

One hundred and nineteen cases were discharged relieved. Of 13 cases of phthisis pulmonalis discharged relieved all were considerably benefited, and had gained in weight before they were discharged, some of them being sent to some seaside residence for change of air. 34 examples of diseases affecting the heart and circulatory system were discharged greatly relieved. They were all chronic cases, the majority of them affected with valvular mischief. There was 1 case amongst them of aortic aneurism, with symptoms of severe dyspnœa with open air passages,—cardiac dyspnœa. I do not remember any instance in which enforced recumbency in the complete horizontal posture, in combination with large doses of potassium iodide, was attended with greater benefit.

Of 6 cases of diseases affecting the uterine system, 1 of pelvic abscess, 2 of prolapsus of the uterus, and 1 of ulceration of the cervix, all treated by simple position of the body, the relief was so great that they might have been considered as belonging to recoveries, but for the fact that they were still suffering, when dis-

charged, from the debility incident to long confinement in bed. 14 cases of subacute and chronic rheumatism were also discharged so much relieved that the patients wished to resume work. Lastly, 12 cases belonging to the miscellaneous group, including two instances of bronchocele, went out considering themselves sufficiently well to resume employment.

CASES DISCHARGED AS UNRELIEVED.

Nineteen cases were discharged unrelieved, a smaller number in proportion than those referred to in last report on 200 cases. They were patients suffering, in many instances, from mental affections: thus, 2 were cases of dementia, 1 of partial imbecility, 1 of general paralysis, and 1 of puerperal mania. A case of measles was discharged under this head so soon as the disease was discovered, in order that the contagion of measles might not spread, and 1 patient with tuberculosis was discharged unrelieved in order to go into the country.

CASES ENDING IN DEATH.

Fifty-seven patients died out of the 500 under treatment. Of pneumonia there were 5 deaths, of double pneumonia 1, of pneumonia with complications 2. Of broncho-pneumonia there were 3 deaths, one occurring during an attack of measles; of capillary bronchitis there was 1 death, of phthisis there were 3 deaths, one complicated with diabetes, and another with pericardial gangrene, the third in the last stage of phthisical disease. Of the cardiac cases, including diseases of the arterial circulation, 6 died from mitral incompetency, 1 of them with pericarditis, 1 from plugging of the pulmonary artery, and 1 from the same cause

affecting the tricuspid valves ; of pulmonary stenosis 1 died, of endo- and pericarditis 1, and of rupture of the descending aorta 1, the rupture extending into the œsophagus. Of fatty degeneration of the heart 2 died, in one of which cases the kidney was diseased. Of diseases of the alimentary system there was 1 death from infantile diarrhoea, 1 from intussusception, 1 from purulent peritonitis, and 1 from cirrhosis of the liver. Of diseases of the nervous system 3 died of meningitis, and 8 of tubercular meningitis. Of diseases of the urinary system there were 2 deaths from acute nephritis, 2 from tubal obstruction after scarlatina, 2 from interstitial obstruction, also after scarlatina, and 1 from chronic Bright's disease. Amongst the uterine cases there was a fatal case in a woman of intemperate habits, who came into the Hospital with persistent vomiting, miscarriage, and sudden collapse. Amongst the miscellaneous cases there were 2 of diphtheria brought in at a late stage, in one of which tracheotomy was performed with temporary relief; there was a death from infantile remittent fever brought in also at a late stage. There was a death from necrosis of the upper jaw, with gangrene of the lung, and 4 from general tuberculosis.

Reviewing these examples of fatal disease I can fairly say of them that from the first, as they came under our observation, we were obliged to consider them of the most serious character. The cardiac cases were of old standing, and came to us as a last resource, and the same may be said of the pulmonary cases, or those in which both lungs and heart were involved. The deaths from intussusception, purulent peritonitis, and cirrhosis of the liver, all carried forecast of death. The 11 cases of meningeal disease were also hopeless

from the first; they were young subjects, presenting characteristic symptoms, who died, ultimately, in a comatose state, offering no promise of recovery from any system of treatment at present practised. The fatal cases from affection of the kidney belonged, in like manner, to the intractable class, as did the remainder of the examples given in the list.

MORIBUND CASES.

There were 7 patients brought into the Institution moribund, for whom nothing could be done. One, a case of pneumonia with old-standing cardiac disease, lived sixteen hours after admission. Another, a patient with an intemperate history, with empyema and purulent pericarditis, lived seventeen hours. The third, a case of fatty degeneration of the heart, lived seven and a half hours. The fourth, a case of pulmonary stenosis in a child four years of age, lived seventeen hours, being unconscious during the greater portion of the period. The fifth was a patient with gastro-enteritis, who died within four hours. The sixth, a patient with purulent peritonitis, died within six hours; and the seventh, a patient sent in as a case of enteric fever, from a long distance, with symptoms of perforation into the peritoneum, died within twenty-four hours, the *post mortem* confirming the diagnosis and disclosing extensive intestinal ulceration and perforation.

COMMENTARY.

I reserve for another communication a number of interesting practical details belonging to the management of the 500 subjects of disease whose histories are epitomised above, but there are a few general facts which cannot well be omitted in the way of comment.

I have already stated in this report, as in the last, that the employment of alcohol in treatment was altogether excluded. To this should be added the fact that no substitute for alcohol was in any instance introduced. It had been rumoured, in 1892, that ether was employed in the Hospital in order to take the place of alcohol when what is called a stimulant was demanded. I, thereupon, issued a direction that ether should not be administered on this hypothesis in my practice unless I prescribed it myself, and I did not prescribe it once. The explanation of this rule is very plain. I prescribed, throughout, on the principle that the idea of stimulation even in collapse is false from beginning to end. My argument is that if the circulatory or nervous powers are failing it is of no use driving them on for a short time at a rapid pace. The driving process, by the action of a stimulant, only wears out remaining power more rapidly. There is revival for the time, possibly,—although that requires looking into more rigorously than has hitherto obtained,—but when the revival is over there is greater collapse, demand again for stimulus, with a repetition of rise and fall, which is anything but beneficial. My plan has been to avoid temporary stimulation and to give steady support, trusting to the natural swing-round towards restoration, under careful feeding, continuous warmth, breathing of warm air, the horizontal position, and, as medicinal measures, such remedies as soothe and bring rest, like chloral, opium, the bromides, and digitalis. To my mind nothing could have been more satisfactory than the system thus described. To any one who has witnessed the recovery from apparently hopeless conditions under this mode of treatment, minus the use of alcohol, the results at first sight would be almost

startling. Thirty years ago I am certain I should have treated every one of my worst cases with alcohol in one or other of the modes of administering it, but I certainly should not have seen such good results as followed its absence, and I am quite sure that the quickness and soundness of recovery, when recovery occurred, would neither have been so rapid nor so sound. I noticed these advantages most strikingly in the examples of enteric fever. There were 5 cases of enteric fever in my last report, 11 in this, 16 in all. They were characteristically typical of the disease. They occurred at various ages; some of them were extremely severe, and all were anxious, but there was not a death amongst them, and convalescence, in the majority of them singularly rapid, was not in one prolonged. The number is too small, of course, to be reckoned upon too enthusiastically, and I should not think of adducing the results as anything peculiar, except that they show how foolish it is to conceive that alcohol can have anything to do specially in the successful treatment of the fever. Of the treatment of the diseases of the alimentary system, minus alcohol, I can say nothing but what is good. Five cases of acute gastritis, 1 case of gastro-enteritis, 8 cases of typical gastric ulcer, 10 cases of acute dyspepsia, 2 of bilious dyspepsia, 1 of dysentery, 2 of perityphlitis, and 1 of catarrhal jaundice, recovered in a manner that was beyond my expectation, presenting, to past experience, even a novel aspect.

A similar good result was observable in the rheumatic cases. Out of 71 cases of acute or subacute rheumatism, the large majority acute, and attended with temperatures moving up to 104° Fahr., 69 recovered, and 2, although they were discharged without being put on the recovery list, were so far relieved that a few days'

change in country air seemed all that was required to induce full restoration. Comparing the experience of the treatment of acute rheumatic disease without alcohol with that which I have previously observed with alcohol, I can have no hesitation in declaring that it is of the greatest advantage to follow total abstinence absolutely in this disease. The pain and swelling of joints is more quickly relieved under abstinence, the fever falls more rapidly, there is less frequent relapse, and there is quicker recovery. In brief, the experience of treatment of rheumatic fever minus alcohol presents to me as much novelty as it does pleasure, and I am convinced that if any candid member of the profession could have witnessed what I have witnessed in this matter, he would agree with me that alcohol in rheumatic fever, however acute, is altogether out of place. I am also under the conviction, though I express it with great reserve, that in acute rheumatism, treated without alcohol, the cardiac complications, endocardial and pericardial, are much less frequently developed than where alcohol is supplied. Theoretically, there are good reasons why this should be so; for alcohol, by quickening the motion of the heart, must needs produce an excess of friction, and must likewise modify structural changes which are not favourable. Practically, to my mind, the theory is supported by experience in treatment.

Referring again to the mortality in the five hundred cases under review, I feel quite content to rest on the general results. By comparison with other hospitals, it would be easy to show that a mortality of 11·4 per cent. out of so many examples of acute and serious disease is as good a return as could have been obtained in any other hospital. Throughout there was no

selection of patients for the trial. On the contrary, the instruction was for the resident staff to receive every case, however severe, and so soon as convalescence would allow for the removal of patients under recovery their beds were vacated at once in order that new and pressing occupants should be admitted. The wards were always well charged, therefore, with persons suffering from acute or very serious chronic disease. The general result is, consequently, most satisfactory. Nevertheless, I do not rest on the general outcome. Having no prejudice against alcohol as a medicine, and having no desire to breathe a word that leans improperly on one side or the other,—having no object in view but to collect facts derived from natural observation, I have questioned myself seriously, whether there was a single case ending fatally that could have been benefited—shall I say saved—by the administration of alcohol? Unhesitatingly and conscientiously, I believe there was not. When I was accustomed to prescribe alcohol, I should have prescribed it in every one of the fatal cases, not, in all probability, with the expectation that they would have recovered under its use as a matter of necessity, but from habit, and from so ingrained an idea that its employment was such a necessity, that if they had died in larger numbers I should still have believed that its administration was right. In like manner, and for the same reasons, I should have administered alcohol largely in the 60 per cent. of cases that recovered, and in the 24 per cent. of cases that were relieved; and if any of these had died I should not for a moment have assumed that alcohol had anything to do with the death. I should also have been sure to have believed that in every

instance where alcohol was given, it had assisted the recovery ; a belief which we now see had no actual foundation, since recovery without alcohol was certainly as good, and in many instances better.

Let another remark or two be the conclusion of this paper. It has been admitted to me by some who have seen the practice, that they are astonished at the results, while at the same time they think that alcohol having certain physiological properties, it is an extreme practice to omit it altogether in the treatment of disease as I have done. "Why not," say they, "why not use it exceptionally and in its proper place?" My answer may be condensed as follows. This grand experiment is crucial, and must not be interfered with by fear or empty faith. Now that my eyes are open I do not see the proper place for alcohol. It is true I do not object to alcohol as a medicine, if its value as a medicine can be precisely defined ; but to one who is seeking knowledge as apart from mere faith, it holds a peculiar position. If it be admitted as a necessity once, why not admit it twice, three times, any number of times ? And, if it be admitted in that way, what else could be inferred except that we are unable to do without it?—a false inability that would have destroyed the whole value of the inquiry, and left alcohol triumphant. It was necessary, therefore, to withhold it altogether, until it was shown that the sick were injured by the act, a danger that did not transpire.

As a fact derived from direct observation, no injury has accrued from the course pursued. On the contrary, some good directly has been obtained ; with enormous good indirectly, if a false experiment of ages has been, in the slightest degree, corrected. For, although universal error often stands for practical truth, practical

truth is never established until it is emancipated from every species of error, however universal.

To be strictly just to the treatment adopted, it is well to make an analysis of the returns under each head of *recovered*, *relieved*, *unrelieved*, *fatal*. Of the relieved and unrelieved a word or two suffices. The relieved, 121 in number, were, as a rule, patients who were suffering from some form of chronic disease from which they sought relief, not that entire change which denotes recovery. The unrelieved, 19 in number, were all persons who belonged to the incurable class, who were, from their entry, regarded as incurable, but were sent by friends with the sympathetic hope that something more might be tried. These two classes, therefore, may be dismissed from the mind in order to dwell for a moment upon those who recovered and those who died. An analysis of the records of the recovered is, I think, very favourable to the system pursued. Of acute pneumonia, in most cases of what is called the lobar type, there are 24 recoveries out of 29. Of bronchitis—all severe cases—there were 24 recoveries, and 1 relieved, out of 25. Of the acute gastric and alimentary cases there were 46 recoveries, with 6 relieved, out of 54. Of the acute rheumatic cases 69 recovered, and 2 were relieved, out of 71. Of the 11 enteric cases all recovered; and, amongst the 65 miscellaneous, 37 recovered, with 18 relieved. These I respectfully submit are satisfactory results.

Of the fatal cases the record is, I feel, in its way, so far satisfactory, that the mortality is as low as it could be according to our present therapeutical standard. Patients treated with alcohol die, otherwise alcohol would be a panacea universal, but we see from the excellent recoveries in severe cases without it, that

alcohol is unnecessary for sustainment of life in such cases. It is supposed that when the animal powers are failing alcohol quickens for a time the action of the heart, and increases its propelling powers. *Cui bono?* What would have been the use of quickening and increasing the power of the heart in the two fatal cases where a fibrinous mass was obstructing the pulmonary artery? The effect would only have been to drive the obstruction further into the tapering vessel, and to have caused a more perfect occlusion. In the pneumonias, where the lungs were congested with blood, what could alcoholic stimulation of the heart have done? Would it not have increased congestion and exudation? In the case where death was due to the rupture of an aneurism, how could stimulation with alcohol have rendered any service? In the nine deaths from meningitis and tubercular meningitis, what could alcohol have effected, except to have increased vascular pressure within the cranium, caused its too well-known symptoms of intoxication and added to the danger? In the nephritic cases, would not alcohol have increased tension, congestion, and exudation?

Still open to correction, I chronicle these results without fear, asking for them no favour out of the sphere of justice; submitting them without reservation to the present time; leaving them without hesitation to the future.

PHARMACEUTICAL APOTHECARIES.

THE essay on "Pretenders to Physic" in last ASCLEPIAD has led to some cotemporary criticism on the point relating to counter prescribing. It has been represented by certain critics that the suggestion I ventured to make on that topic is a new suggestion on my part. It is not at all new, but is a repetition, expressed in the selfsame words, of a portion of a speech delivered many years ago from the Chair of the Medical Defence Association, and also at a dinner of the Pharmaceutical Society, at which I was once a guest. Another incorrect criticism is that I have proposed to give to all men who prescribe from behind the counter the legal power to prescribe just as they are, in the matter of education; and a case in which prescribing from the counter was followed by fatal results has been adduced as an example of what mischief would be done if counter practice were to become general. But I have never for a moment proposed, never thought of the proposition, that every man who has a counter should prescribe over it. Quite the contrary. My view is that no man should be allowed a counter until he is capable of using it for prescription work in a manner truly useful to the public and creditable to himself.

These two important corrections made, I pass to

describe the precise idea it is my wish to offer. There are no doubt many faults in it; and it is submitted, simply as a suggestion deserving to be considered without either passion or prejudice, as a possible practical solution of a most embarrassing difficulty.

As a preliminary we must, in this case, look to the inevitable. For the many years in which I presided over the Medical Defence Association, we were always obliged to bend to the inevitable in meeting the fact of counter prescribing. We could prosecute offenders for many offences: for out-door visiting, for giving illegal certificates of death, for publishing improper circulars and works, for covering unqualified practitioners, for assuming legal titles without the right, and for other acts, definite in their nature; but we never could see our way to bring a case of counter-prescribing into a court of law as a test case. We had more than one such case suggested, but we knew that although, technically, the law was on our side—the law was on our side in every case—it was inadvisable to summon it to our aid, because it is so hard to separate the fact of advising from the fact of selling in any instance where buying and selling are concerned. “Will it wash?” exclaimed the famous Mrs. Siddons, to a linen-draper who was offering for sale some article of his trade. He was obliged to answer her; and if she lived now and went into a druggist’s shop and asked in regard to a pill, “Will it purge?” the druggist would be obliged to answer, and in answering and explaining would be illegally trespassing on medical pastures, and would be open to trial. In brief, no man can sell a drug without subjecting himself to enquiry about what he is selling; he would not be considered competent to sell unless he knew something of the properties of the articles he

sold ; and the moment a druggist begins to show such knowledge of his business he technically breaks the law.

Worse than that, the chemist and druggist cannot do really useful acts bearing on treatment, however minor they may be, without breaking the law. I once, when on a cycling tour, became a martyr to toothache. I stopped at a village where there was no brother medical practitioner, so I called on a druggist and asked him to clear out the offending tooth and plug it with mastic cement, after benumbing it with carbolic acid. He did the work most deftly, and put me into perfect peace ; but he broke the law. A youth, known well to me, was bitten on the hand very deeply by a rabid dog. He ran, by direction of a policeman, into a druggist's shop, and explained to the owner what had happened to him. The druggist, without a moment's loss of time, put the lacerated hand under a water tap, then plunged it into a basin full of strong solution of ammonia, and, finally, wrapping it up in cotton wool, sent the patient to a medical practitioner, who candidly and truthfully declared that nothing better could have been done, and who attended until recovery was completed. The youth, who still lives, showed no specific symptoms, so prompt and skilful and scientific was the chemist's proceeding. The chemist, in all human probability, saved the life of that youth ; but he broke the law.

A medical friend of mine who had a mighty prejudice against all counter practice, was seized one day with copious epistaxis. He, too, was alone, and could find no aid except in the shop of a pharmacist. He became so faint on arriving there, that he could give no instructions. The druggist, therefore, took the initiative ; he syringed out the bleeding nostril with hot water,

and then plugged firmly with cotton wool, charged with perchloride of iron. The hæmorrhage was staunched, and my friend went his way as well treated, he said, as if a hospital surgeon had treated him. But the druggist broke the law, and neither the man he assisted, nor the Medical Defence Association, nor the Apothecaries' Company would have had the temerity to touch him as an illegal practitioner.

The temerity, if it were acted upon, would be worse than thrown away, not because the present law is bad, but because the act it might punish is a necessity, and necessity knows no law. The attempt at punishing such illegal service, if it were noised abroad, would bring out a degree of public opposition and criticism that no one could withstand. To medicine it would do infinite injury, and he would be looked on as a mere mischief-maker and churl who should dare to make the attempt. Let any medical man ask of himself:—Is punishment, in the case of necessity, a process I would inflict? The question is answered negatively so soon as it is proposed, and ends there.

The safety of counter practice lies in this fact of necessity,—lies, we cannot doubt, as surely as if there were no law against the practice; for which reason some pharmacists, who are quite content with their present position, wish for no change. They are not obliged to undergo any special examination for practice; they have no special curriculum bearing on practice to pass through, no after examination for practice; and they save many fees that would be wanted for preliminary studies, examinations, and government stamps for a diploma. They can do as much prescribing as they desire, without any change, and they do not wish for any change. The amount of practice they

do under the negative protection is incredible. It extends from early morning until late at night, and in crowded and fashionable places is often, in numbers prescribed for, larger than that accorded to the majority of registered medical practitioners. I am making no mistake when I say that in a good business, in a good locality, thirty to forty persons are prescribed for daily, during busy seasons. No wonder there are sixpenny and shilling dispensaries and qualified dispensers earning a livelihood by "poaching," as one of the pharmaceutical fraternity once said to me, "by poaching on our domain." No wonder there should be so many qualified medical men on the verge of starvation when such a large share of remunerative medical practice, with so little of real responsibility, goes to the counter! It is this state of things progressing with unchecked speed and increase I want to remedy. Overstocked medicine is bringing itself, under the pressures of life, to the practice of the pharmacist who has not the requisite qualifications fitting him for the post. My proposal is so to raise the position of the pharmacist as to render him qualified in law, as well as fact, for all the duties he undertakes.

HOW TO DO IT.

The proposition is that the man who assumes to meet the public necessity for minor or pharmaceutical practice should not be allowed to prescribe until he is legally qualified for the duty. He should not be a chemist and druggist; he should not be a pharmacist simply; but he should be a pharmaceutical, or chemist apothecary. He should be registered as such, and the place where he carries on his profession should be registered also. In order to be qualified to practise,

in order to obtain his diploma, he should be obliged to pass through a proper curriculum, including a sufficient measure of hospital practice ; and he should be obliged to pass a competent examination, conducted, say, by a conjoint board formed from the Apothecaries' Society and the Pharmaceutical. The candidate who has succeeded in going through this ordeal should then be returnable to the Medical Council as qualified for registration amongst the order of pharmaceutical apothecaries, with the understanding that should he choose to enter the higher grades of medicine or surgery, the studies he has already completed, and the examination he has passed, should count as part of his curriculum and examination for the higher grade.

Such would be the qualification. As to privilege, under legal sanction it would not be greater than is at present given by the law of necessity. Necessity would be legalised so that it might be argued upon in a court of law, if that were required. The pharmaceutical apothecary would have no right to make visits away from his registered home ; would have no right to fill any medical office ; no power to attend midwifery ; no power to give medical evidence at an inquest ; no power to give a medical certificate of death, nor other certificate. He would not be empowered to do anything that implies any encroachment on medicine beyond what he does at the present moment ; but he would do what he does as a qualified man under the protection of the law.

ANOTHER REASON.

Necessity, the determination of the public to have ready at hand a class of practitioners, good or bad, to whom they can apply in emergency, is the first reason for the change I venture to advocate. There is another

reason, which is really protective to medicine herself, and that calls for the change with a strong and urgent voice. No one can be blind to the fact that the gentlemen who are engaged in pharmaceutical work are becoming aggressive therapeutists. Every morning our breakfast tables are treated with letters, cards, brochures, and bottled or boxed specimens of some new remedy which some medically unqualified chemist has brought out in a new and, as the inventor thinks, attractive form. The virtues of the new article are set forth in the educational style, as if the reader were a mere novice or tyro in the matter. Last week, ending on June 2nd, I had seven of these effusions. Once I had one referring to a therapeutical substance which I myself introduced into practice, with a description of its properties, drawn directly from my first paper on it, but so drawn that a new medicine, introducing a new principle of practice seemed to have been described.

These new remedial substances are sometimes favoured by medical men themselves, who, on the most ridiculous and *ad captandum* observation, give testimonials as to their efficacy. The influence of the pharmacist in this direction is becoming very great, and is extending so fast that for one claimant to public attention ten years ago there are a hundred at this time. These affect the public so favourably that it appears to be, and in fact is, to the interest of every pharmacist to have his own special remedy for some one kind of disease at least. Where this will end, if it goes on unchecked, no one can foresee. It is far more dangerous to the republic of medicine, represented by its duly qualified practitioners, than any counter prescribing; and it is far too serious a danger to be allowed to develop itself *ad libitum*, as it is now

developing. Under proper control it might be useful. But what is to be the control? My answer is, legalise the management of it. Turn the members of the chemical body that engages in pharmacy into a qualified medical body that shall find sufficient scope for its skill without breaking out into new and theoretical enterprises which have in them pretence of practical and scientific meaning, without any reality of science. The public requirement, in its natural form, is assistance in emergency or casualty; that the public will have, and if we do not give it what it usefully wants, it will take, in its ignorance, what it does not want, what it deems is useful, but that is not so useful as it might be, and may, from its unskilfulness, be hurtful.

MEDICINE UNDER THE NEW RULE.

Let us glance at medicine as it would present itself under the new rule. There would be three classes. Class A would be the consultants who, in medicine, surgery, or midwifery, would be at the head of the profession. Class B would be gentlemen in general practice, who would do all the visiting as now, who would not dispense medicines, who would not be troubled with minor and poorer parts of private practice, but who would hold the public offices, and carry out the general and private practice. Class C would be the pharmaceutical apothecaries, who would, as they now do, perform the minor and emergency duties, would dispense prescriptions, conduct analyses if necessary, and, although in business, would be amenable to medical rule and direction, under the protection of medical rank and registration, and under the supervision of the Medical Council. Between these three orders there would at once spring up the best understanding, a more correct

understanding than ever before existed. The representatives of the pharmaceutical class would feel themselves from the first professional men; they would see before them the ready means to reach the higher, the highest branches of their profession; they would come willingly under medical rule and etiquette; there would be no inducements for them to try the side practices inevitable to doubtful qualification; they would win the highest respect of the public, and they would give to medicine a foundation it has never had in the course of its progress. The effect on the general practitioner order would be to lessen the numbers of that order without reducing their efficiency. There would be amongst them no tendency to lower the status by lowering the position to sixpenny or shilling surgeries. Competitions for minor duties would cease, and those who were engaged in general practice, much fewer in number, would stand in a higher social sphere.

The representatives of the highest division of medicine, rising step by step from the other classes, would have a most distinctive position, scientific and social. They would be consultants in the strictest sense of the word, and would be troubled with no extraneous and wearisome labour in order to maintain their elevation.

The work of all the orders of physic would in this way be equalised. The irksome duties of dispensary and hospital out-patient practice would, I believe, be done away with altogether, passing largely into the hands of the pharmaceutical apothecary, who from small fees would realise the large profits that ought to follow proper and competent advice, and which now are lost to the profession, except in the instances where qualified men imitate the druggist and open shops or dispensaries on their own account. By the poor, payment on a scale

that would meet their means would not be grudged, and the apothecary, situated in convenient centres, would reap the benefit. Hospital practice would be largely, perhaps entirely, limited to indoor hospital practice under the directions of the teaching clinical professors; and hospital skill, turned to its proper use, without injury to the profession at large, would be confined to serious cases, and would not extend to patients who, requiring casual treatment near to their homes, now find it through the independent act of seeking unqualified advice promptly and at moderate cost. In this manner the whole community would contribute to the support of professional skill, except in the limited numbers of indoor hospital patients above referred to. In regard both to the public and the profession the plan would be infinitely preferable to that mixed system of irregular counter practice, cheap dispensary practice, over-crowded out-door hospital practice, and gratuitous home practice, which at this time prevails in such an uncertain and unsatisfactory degree.

BUSINESS *versus* PROFESSION.

An objection may be taken to this scheme on the argument that medicine is a profession, not a business, and that to mix up the two things would be derogatory. Shall the man who prescribes for the sick be the man who makes up the prescription of another man, and sells the medicine—the man too who sells other things pertaining to medical practice and makes a profit by the same? Here, I know, is a sore point; but in this day, when every man is more or less commercial, I cannot for the life of me see a great objection. I speak under as little bias as any man can feel on this subject, for I have been so fortunately placed that, during the forty

years or more I have been in practice, I never had occasion to keep an account book, or to make out an account. But surely, if a patient coming to me, knowing my fee, tenders me a five-pound note, I have no alternative but to take the note and give him the change? Every other physician must occasionally do the same thing. As I take it, this is business on our part. We take the exact fee for our advice and prescription; we sell both,—as much a business transaction as though it meant the passing of two shillings or two sixpences over a counter. The one is a more imposing business than the other, I admit; but it is business all the same, and to the people it conveys the same impression precisely in either case. If, like the clergy, we could perform our ministrations by reception of fixed salaries, we should seem more independent, but even then it would be business; so that the matter of payment being different in degree and form only, does not alter the argument now in hand. Perhaps, indeed, it strengthens it as leading to ready-money, or fee payment, instead of allowing credit and sending out bills, always a cause of dissatisfaction, unnecessary trouble, and worry.

There is another reform also that might safely be expected if the suggestion now made were carried out. The tone of business in the ranks of the chemist apothecaries would naturally change. Every article necessary for the sick would be purchasable of them, but a number of things, like patent medicines and goods which the perfumer deals in, would be discarded. The sale of such things would be looked down upon as inferior business, when there was sufficient to do and live by without the sale of them. There would be the work of the consulting-room, the work of dispensing, the work of

the laboratory, all good and honourable occupations that would secure a competent income of themselves, and to some men of learning and skill would be more congenial than the sterner and more responsible duties of practice in serious forms of disease belonging to higher medical, surgical, and obstetric practice. The simpler work would bring an inducement to many to devote themselves to scientific and chemical studies leading to the highest ranks of learning and science.

Best of all, as I think, the outrageous quack would disappear from amongst us. There would be no occasion for his impudent display. The deluded patient, largely in one class of disease, now resorts to the charlatan, because he is nervous about his reputation and goes to the man who is most secret and most ready at a moment's notice to give him the attention he demands. Let such a man have no excuse for seeking the quack, and the quack, finding no excuse for putting himself in evidence, will die out. Every qualified pharmaceutical apothecary would be an obstacle to the intruder, and ready to give the assistance immediately required.

THE REDUCTION OF DISEASE.

Up to this time I have treated on this great question purely from the professional side, in a self-interested point of view. There is more than self-interest in it; there is the public interest in relation to the suppression of disease. I have not the shadow of a doubt that if the plan here proposed were manfully carried out, it would lead to an incalculable reduction of disease. It would meet disease properly and scientifically in its earliest stages, and prevent it there. Day by day now, especially in regard to hospital patients, what do we hear from them? They were not feeling well; they

spat a little blood; or they had bad digestive disturbance; or they were ready to faint; or they felt pins and needles in their hands and feet; or they suffered from vertigo, and could not see plainly the position of the vehicles in the streets; or the child had a cough, and they feared it was going to have bronchitis; or it had a running at its eyes, and they thought it might be sickening for measles; or diarrhoea came on, and some medicine was wanted to check it; or there was a bilious attack which caused nausea and headache. These and many more ailments in their early stages were presented, and they, the sufferers, "went to the chemist and got something for the moment." A very common excuse, which means too often so much lost time to the sick. The plan described now would bring all this practice into the legitimate domain of medicine, enabling many a struggling man in medicine, at his wits' end to live, to obtain an excellent income, and giving to many an aspiring pharmacist a mode of getting a living less the annoyance of petty cash sales which are repugnant to him, and with which he thinks and feels he ought never to be connected. But I repeat, this is not everything. The public would reap the chief benefit. The sick in the earliest stages of disease would find competent advice at hand, and in serious dilemmas would pass naturally from the qualified hands of one man into those of another of higher qualifications without demur or explanations of excuse or apology. In urgent cases, if the patient were rich or competent, he would be recommended to seek the advice and skill of a general practitioner or of physician, or surgeon, without delay; if he were poor, he would be recommended, by the best of all recommendations, to the hospital.

There is yet another reason for the change proposed in this paper, a reason which is not to be despised. The arrangement would bring everything in the science and art of medicine into uniform working and order. Medicine would become a true brotherhood in all its faculties. At present a medical man would never think of opening a communication with a druggist respecting a sick man for whom the druggist had prescribed over the counter, and who afterwards came under the qualified care of the practitioner. The practitioner would think the act of consultation beneath him, and naturally so, nay, properly so, as things now are. But break down the barrier, or, to speak more correctly, give the pharmacist, by a higher and better qualification, the means to cross the barrier that separates him from medicine proper, and on neutral ground the two might meet, for the moment, on the most cordial terms. There would be no need, no expectation, of any further consultation when the preliminary act leading to transference was over, but there would be continued confidence and good feeling on both sides, just as there is now when a practitioner transfers to a surgeon a patient for operation. Sometimes, in fact, we do combine with the pharmacist even in consultation on certain matters of signal importance. When a new pharmacopœia has to be brought out we do not hesitate to take a distinguished Pharmacist like the late Mr. Squire into consultation, and we think none the less of the valuable Extra Pharmacopœia because Mr. Martindale has a hand in its production. Things would come about in the same fraternal spirit if a new order of pharmaceutical apothecaries helped, in a qualified way, in the prevention and treatment of disease.

OPUSCULA PRACTICA.

“There are mites in science as well as in charity.”

BENJAMIN RUSH.

ON FUMBLING, STUMBLING, AND MUMBLING AS SIGNS OF DECREPITUDE.

HAVE never met with a person between sixty and seventy who did not present more or less evidence of one of the above-named signs.

In many of that age all three are present; in some one only or two, and these in different degrees.

Fumbling, as a rule, comes first. It is quite independent of any disqualification of four senses—although some disqualification may co-exist—of seeing, hearing, smelling, tasting. It is, in fact, a kind of paralysis—let us call it a paresis of the sense of touch—attended also with some imperfect co-ordinate muscular movements of the upper limbs, especially of the fingers. We see it first in attempts to do delicate acts with the fingers—the threading of a needle, the holding of a needle, the tying or untying of a knot, the sorting of cards, the opening or closing of a knife, the arranging of papers, the cutting of the leaves of a book, the winding up of a watch, and such like. It is, perhaps, best seen in the act of penmanship. The pen is held with a firmer hand than usual; with the pen very upright, so that it digs into the paper, the firmness specially introduced in order to make the writing clearer, legible as to turn of letters, and correct in regard to the

formation of words. It is a process of guarding against fumbling; but it does not succeed brilliantly, and usually proceeds from bad to worse. I remember once, while giving evidence before him, seeing a learned judge fumbling over his writing, digging in, correcting strokes of letters, dotting his *i*'s, crossing his *t*'s, then striking out a word and rewriting it with more care,—and probably, for this often happens, with less legibility. He was not a very old man, but I was certain that he was fast passing into decrepitude, and was making his way rapidly towards *le précipice affreux* of M. Bossuet. It was as clear a case of *Marche, marche, il faut marcher* as ever was witnessed; and the events soon proved the correctness of the diagnosis. I saw the same thing in a once famous surgeon—one of the deftest, boldest, neatest, surest operators that ever lived. He had performed, and performed well, the major parts of a great operation; but I observed that when he came to the tying of the bloodvessels he left that part of the proceeding to his assistants, and when the external wound was being closed with sutures, the fumbling way in which he held the needle, and the uncertain way in which he introduced and tied the threads—getting one end mixed up with another—made it sure that he could not go on much longer; a diagnosis which also turned out correct.

Thus fumbling becomes a certain sign of decrepitude; but it is also a sign of disease. When it occurs in the younger members of the community, it is an indication of some wasting or nervous disease, such as albuminuria, diabetes, or phthisis, or of some organic change in the nervous centres, especially in those affected in locomotor ataxy. In the last-named form of it, it is commonly of intermittent type, absent in the early morning

after a good night's rest, present strongly in the evening after a busy day. In advanced age fumbling passes into a more determinate failure. When the senses of sight and hearing begin to fail, it, as a loss of vital activity, increases so much, that in the very aged it is one of the worst infirmities connected with decrepitude, or, as the death certificates designate it, "senile decay."

Stumbling as a sign of decrepitude is a later sign, unless produced from some other favouring cause of it, such as an accident, rheumatism, gout, or sciatica. It means failure of power, paresis of the muscles which flex the thigh on the pelvis, the rectus femoris and great layers of muscular substance which lie in front of the femur and help to pick the feet off the ground in propelling the body forward. It is due to some central failure in the spinal cord, and is the cause of many accidents from falls in persons of advanced life. The toe catches in a carpet or against some other obstacle, it may be of quite a trifling kind, which comes in the way, and the extensor group of muscles, being less disturbed and unimpaired in function, go on, and, pulling the half-lifted limb suddenly down, the body goes forward, and by its weight leads to a fall. The danger is greatest when hurry is added to action, as in getting hastily into a cab or carriage, or in making haste to a train. Under hurry and continued strain by which the nervous power is exhausted, it is remarkable how small an obstacle—a pebble, a step one or two inches high, a staircase rug—will cause a stumble, even when, according to outside appearances, the muscles seem still in good condition. I have seen a man who could ride a tricycle stumble in walking over a rough road or a flight of stairs so badly

that, without the aid of a stick, a companion's arm, or similar support, he could not get safely onward. Stumbling is a leading sign of decrepitude when it occurs apart from acute or subacute disease or accident, and must always be accepted as an indication of declining age and be protected against accordingly. Once pronounced, it is a defect rarely recovered from. It will be lessened by repose, but will quickly be reproduced by over-exertion of any kind, and even by worry or mental over-strain. It is more dangerous than fumbling as an accidental disturbance.

Mumbling is a paresis of the tongue and the muscles of the lips and face—orbicularis oris, masseter, depressor angulæ oris, all the muscles concerned in speech. I am not sure that it is a failure most common to those who are fullest of words; but I am sure that it is most common in those who have to use the muscles of speech most rudely, such as persons who have to cry out in the street, or otherwise exercise their vocal organs with force and rapidity. As a defect, it betrays itself mostly in the difficulty of fully pronouncing consonants. The consonants are slipped out more or less, or are half rendered, slurred over. It is attended with impairment, as might be expected—with impairment of sound of voice, the cords and muscles of the larynx being co-operatively affected. It is sometimes attended, also, by deficient nervous control of the salivary glands, and not infrequently by a tremulous condition of the lower lip. It is a very marked sign of decrepitude, and when it is seen in persons of middle life, and is not due to feebleness induced by acute disease, is an indication of premature old age.

Fumbling, stumbling, and mumbling stand in relationship to each other, in a pretty regular degree, as

signs of general feebleness, signs peculiar, as a general rule, to men and women of indifferent stamina before true old age. It is fair to say, at the same time, that all these defects are to an extent hereditary. Some persons born of parents whose hands and limbs and voice have been trained to hard, rough work, and who by such work have been short-lived, are born with a tendency to the defects specified, and in all competitions where quickness, precision, and nicety are demanded are usually beaten by others of more fortunate origin. This man or woman is clumsy, that is elegant. So much for traits of birth!

In these remarks I have simply recorded natural facts, leaving, as usual, the inference to speak for itself. I would not too severely condemn to decrepitude and early death every fumbler, stumbler, mumblor,—or even grumbler, who often comes in the same category; but I would advise such that they should do things they ought to do, and leave undone things they ought not to do. For example, if they have not made their wills, it is time to make them; whilst they ought not, under any pretence or solicitation, to offer themselves for Parliament.

DIABETES FROM MENTAL SHOCK.

THERE is a form, and a very severe form, of diabetes which is brought on, especially in the young, by mental shock. I treated on this a good many years ago, owing to my attention having been turned to a striking case of the kind; and, recently, I have met with two other examples of the same nature. The first case that came under

my notice was that of a boy about twelve years of age, the son of a carpenter. He was a very bright little fellow, and had enjoyed all his life the best of health, escaping remarkably from the usual infantile and childish diseases. Near where his father lived there was a woodyard, kept by a very ungainly, Quilp-like sort of fellow, who delighted in rough jokes, and in threatening those weaker than himself. One of the freaks of this man was to tie up a dog that was very savage to a kennel in the yard. The pathway leading to the office passed this kennel, but was sufficiently distant from it not to allow the dog at the length of its tether to reach it within four or five feet, so that the animal, when any one who was strange went down the path, could bark and try madly to get at the stranger without being able. The little boy went down with a message from his father, knowing nothing of the chained animal; and, when the dog suddenly burst out upon him, it so frightened him that he stood half paralysed, screamed, became faint, and got back home extremely exhausted. As if he had been mechanically injured in the brain near the fourth ventricle, he began at once to pass large quantities of urine, which the practitioner who was called in thought at first, naturally enough, manifested a mere hysterical condition. Soon, however, it occurred to him that the diuresis was too prolonged. He therefore tested for sugar, found it in abundant quantities in the urine, and brought the patient to me. The poor boy remained under our care until his death from diabetes, the disease running its course with great rapidity and defying every means of cure. We medical men were of opinion that the savage who kept the woodyard was liable to an action for the injury done; but the lawyers whom his father consulted,

including an eminent counsel who was also consulted, were of opinion that there was no sufficient proof of a legal kind that could constitute a ground for action. They urged that a precedent was wanted to support the argument that diabetes could be induced by mental shock in the manner suggested; and so the idea of a trial was abandoned.

I have now under my care a case of a similar kind. A young woman took fright in consequence of a fire which broke out near to her—on the floor, in fact, in which she slept. She was exceedingly alarmed, and was seized quickly afterwards with diabetic symptoms, in an extreme degree. She is twenty-five years of age, and up to the time of her attack has enjoyed an unusually healthy life; but there is in her history this curious fact, that her brother, one year older, a few months ago died from acute diabetes immediately following a severe mental shock.

Physiologically there is nothing peculiar in these phenomena, for perhaps there is no fact more clearly established than that certain mechanical injuries to the brain are capable of setting up the diabetic condition. I have noticed that men engaged in white-washing ceilings sometimes become giddy during their work, from the prolonged position of the head thrown backwards, and that a temporary diabetes may then present itself. Four examples of that kind came before me when I was carrying out my inquiries on occupation and health. Mental shock seems to me to lead to a similar state—it may be by rupture of a minute vessel in the brain, or by a slight effusion. Whatever is the exact pathology, the mischief inflicted leads to one of the most serious types of the diabetic disease, and I call the attention of other

practitioners specially to it, that they may add their observations to mine on a very important practical and medico-legal question.

*A PRACTICAL POINT IN THE TREATMENT OF
ENTERIC FEVER.*



PATIENT suffering from enteric fever was saved, as far as human judgment can fairly discern, by attention to one simple detail.

The patient was a young woman who had passed through a very severe attack of the disease, and was thought to be practically out of danger ; the temperature, which had fallen to the natural degree, had remained steady for some days ; and such was the general improvement that I had ventured to increase the diet table, when, somewhat suddenly, there was a relapse : the temperature rose to 104° , with accompanying quickness of pulse, prostration, loaded tongue, slight distension of the abdomen, and some tenderness under abdominal pressure. On inquiring as to the cause of the relapse, the only symptom affording a guide was the fact that there had been no action of the bowels for several days. Previously there had been free action, with passage of abundant quantities of the characteristic pea-soup intestinal discharge, and consequently we had been chary, when this discharge stopped, of restarting it, and had permitted the constipation to continue. As the patient now complained of desire for action of the bowels without the power to defecate, I suspected that the rectum was loaded and obstructed, and that, in the small intestine, there was an accumulation of fluid secretion of specific character, from which absorption of septic matter was in progress, with recurrence

of the febrile state and the alarming condition. On this diagnosis I ordered that a large enema should be administered at once, and by it there was removed from the lower bowel a firm, very large, and shaped mass of feculent matter, followed about an hour afterwards by the passage of a pint or two of the specific enteric fluid, excessively offensive, and in fermentative decomposition. The good results of this treatment were immediately obvious. It was like the effect of opening a large abscess and setting free purulent matter. The temperature of the patient fell, the tongue lost its dryness, and the sense of prostration passed away. We returned for a few hours to the treatment that had been pursued in the previous part of the case, but as the temperature remained normal, and the discharge from the bowels did not give trouble, careful feeding was adopted only, and an excellent and rapid recovery resulted.

I have seen in many other cases of enteric fever a similar return of the acute febrile symptoms, but no case opened my eyes to cause and effect so clearly. I cannot doubt that, in this instance, if the obstruction in the rectum had not been removed, there would have been a continued accumulation of specific fluid in the small intestine, a continued auto-infection, increased virulence of fever, delirium from action of toxic fluids or gases in the cerebral and other nervous centres, poisoning of the sympathetic centres, tympanitis with distension of the abdomen, septic poisoning of the blood in the liver and great abdominal veins, congestion of the lungs, collapse, and death. By giving escape to the discharge we prevented these evils and two more, I mean ulceration of the intestine, owing to the presence of the specific fluid, and perforation; in short, all the fatal dangers incident to the local mischief in the canal.

The lesson derivable from these observations is:— whenever in enteric fever there is relapse with constipation, ascertain if the constipation is produced by a solid obstruction to the passage of intestinal fluid, and remove such obstruction, if it be present, without a moment's delay.

EXPOSURE OF THE BRAIN DURING LIFE.

IN the Workhouse Infirmary of Newcastle-under-Lyne I once saw, under the care of Mr. Yates, a well-built man aged thirty-six years, who, from disease of the bones of the head, arising from syphilis (two attacks), had lost a large piece of the parietal bone on the left side. A portion of brain of nearly one inch and three-quarters in diameter was thus laid bare, and the membranes were also destroyed: the cerebral surface was covered with a thin yellow false membrane, almost like a waxy secretion. The pulsation of the vessels of the brain was immediately under the eye. The man suffered from syphilis a second time six years before I saw him, and a few months after the attack he had several fits of an epileptiform character. Two months after the first fit he perceived on the head a swelling, which was laid open. His friends reported that after this “he lost his senses, and did not recover them for several months.” Two years later there was an open wound on the left side of the head, and a piece of bone came away, in one piece, from the upper part of the left parietal bone, another piece exfoliated from the outer table of the frontal bone, and the septum of the nose and part of the roof of the mouth gave way. A little pus was daily discharged from the opening in the skull, and

occasionally, but very rarely, the man had epileptic fits : he was dull, heavy, and at times much disposed to sleep. When he was excited, as by sharp walking, the pulsation in the brain was very much increased ; but when he was at rest and drowsy, it was less perceptible.

The symptoms which then showed themselves were stomachic ; the patient felt nauseated, and had a sensation of sinking and depression. The action of the pulse, too, was modified, the number of pulsations being reduced.

It has been observed in other cases where the brain has been exposed that the movements of inspiration and expiration are to be seen in the brain. This fact, which was noticed by the great Haller, was at one time thought to show, and even to prove, that the blood, in passing through the lungs, is impeded slightly during expiration, and that this impediment, reflected throughout all the viscera, gives rise to what has been termed the visceral respiratory pulse. In this case under Mr. Yates I could not satisfy myself as to the existence of a respiratory pulsation, although I could readily see the pulsation that was synchronous with the beat of the heart. Perhaps I made too brief an observation in reference to the respiratory pulse.

Physiologically, the case shows that the circulation through the brain may take place in a sufficiently active degree to sustain life, although the brain itself is directly subjected to the pressure of the atmosphere. In this sense it exhibits phenomena which are of interest in reference to the theory of Dr. Kellie that the quantity of blood in the brain must always be the same, and to the researches of the late Sir George Burrows, which indicated that while the quantity of blood in

the brain is nearly equally the same, variations may occur. Unquestionably in this instance variations did occur in the circulation, and the question is whether these are determined by the fact that the cranium is open, or whether they would be manifested as certainly as if the cranium were sealed up. From what I could hear of the man, I inferred that the atmospheric pressure on the brain did, in truth, disturb the circulation through it; but a series of observations were required, in which the condition of the man in regard to sleepfulness, oppression, and condition of the pulse should have been recorded side by side with the variations of the barometer, and these were not carried out.

*PROPERTIES OF A TRUE ANTIPYRETIC; AND ON CHLORAL
HYDRATE AS AN ANTIPYRETIC.*

WE have arrived at the conception that so true an antipyretic substance or method may be found that whenever there is a rise of animal temperature in disease—a *fever*, to use the shortest and most expressive term—we ought to be able to check the heat at once, as easily as the housewife cools the water when she takes it off the fire, or adds cold water to hot. We have also empirically discovered some medicines which have the effect of reducing temperature; but what is really wanted is principle in this matter, as opposed to mere empirical observation. The substance to be used medicinally, for this purpose, must have three qualities:—

1. It must be antiseptic.
2. It must be volatile.
3. It must have the slightest solubility in blood.

If it be not antiseptic it is negative in its action as a suppressor of animal heat. If it be not volatile it accumulates in the blood and tissues, acts then as a foreign body toxic in its nature, and causes itself secondary symptoms which are mischievous and unnecessary, taxing active eliminating organs, like the kidney, to an undue degree. If it be very soluble in the blood and in the fluids of the tissues, it is the more objectionable on account of its fixation and slow elimination.

The value of ammonia as a medicine rests largely on its possession of the three qualities named above. Ammonia is a splendid antiseptic, and it is volatile, but it is too soluble, and too powerful a solvent. Given in sufficient doses to check the animal fire, it dissolves the red corpuscles, prevents the free absorption of oxygen from that effect, and by its presence in the blood also tends to prevent oxidation.

Chloroform possesses many of the properties required. It is a splendid antiseptic; it is volatile; and, feebly soluble in blood, it does not produce any fixed toxic symptoms, nor tax the eliminatory organs unless carried to anæsthesia. I have used it as an antipyretic for over forty years, and with much satisfaction; but the difficulties of its correct administration have stood much in the way.

Hydrate of chloral, an agent of this same class, is more manageable. It is an antiseptic; it turns into chloroform and sodium formate in the body, so that it is both volatile and eliminative, and unless it be pushed too far it is not toxic. In my first observations made on it immediately after Liebreich's discovery of its narcotic effects, I discovered its remarkable power of reducing animal temperature, and pointed out that

when it kills by a large dose, the mode of death is by reduction of temperature of the body. Since then I have employed it regularly as an antipyretic, and the results I have witnessed from its use surpass all others. It is without a doubt, when correctly administered, an admirable remedy for pyrexia, and in enteric fever it is, I believe, the best.

THE REVOLT OF THE WET-NURSE.

IT is reported that in Vienna, at the present moment, the wet-nurses are on strike. They have held what may be called a strike meeting, and have set out their demands in the usual formal manner. In the first place, they consider that they are not well treated. They are not and will not be considered as servants; they are not to be dressed as servants, and are always to receive the official title of *amme*, a word allied to the Dutch word *ammen*, meaning, to nourish. In the second place, the *amme* is not to have imposed upon her any of the ordinary household duties in her leisure hours. Thirdly, she is to have good wages—fifteen francs a month. And lastly, when her time has expired she is to be allowed thirty florins, so that she may dress herself, and appear in a fitting form for another situation.

I do not myself think that these terms are exorbitant in any particular. If a young child, born into this world, must have another mother than its own to nourish it, it is quite right that such mother should be something better than a servant. It has been observed that

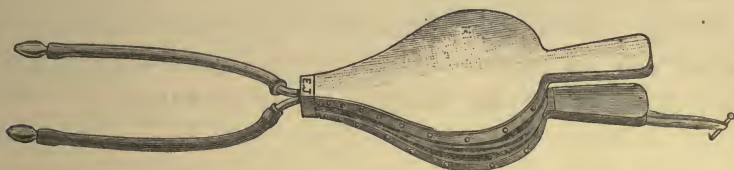
English foster-mothers who have acted in that capacity to the rich and aristocratic classes of children, have, by their influence and manners, transformed the children to a great extent to their own likeness and manners. Nothing is easier than such a transformation. The infant not only draws in the nourishment on which it lives from an outside source, but, by imitation, it draws in also the character with which it is most closely brought into contact. As it begins to learn it acquires the sounds in which the words it catches are pronounced, and as it becomes more intelligent it absorbs the ideas, the prejudices, the superstitions which arise from the first impressions made upon it. It is, therefore, better that it should hear intelligent sounds, and see intelligent actions by her who is to play, for a time, the part of its mother. The other terms required seem also to be reasonable. A nursing woman ought not to be driven to the drudgery of domestic life. She is doing enough if she is supplied with such food and such exercise as shall cause her in the most healthy way to secrete the food she must, in turn, supply to the infant under her care. The pay demanded appears also to be anything but exorbitant; fifteen francs per month is certainly not excessive wage, and thirty florins at the end of the service cannot be excessive, although I somewhat fail to see how the sum can be earned without the *amme* herself becoming again a mother. This is one side of the question; but there is another, which should appeal to all womanly minds. The whole system is a degraded one, and ought to be accepted as such by every thinking member of the community. Can there be a greater outrage than that a woman, at any wage, should give up her life—for it is nothing less—to a stranger's child, leaving her own to the

chance, nay, almost certainty of an inferior protection ? The *amme* ought not to revolt simply, she ought to retire altogether, and nourish that alone which is nearest and dearest to her. It is not shame to her so much as necessity, that leads her to any other course. But what shall one say of the other mother, the real mother, who literally sells her child to another, during the most important and delicate part of its life ? These women know not what they do, and though they are called ladies they are so reprehensible that another term is far more applicable to them. For the sake of pleasure—what they call pleasure—they sacrifice the best blessings of life. If they themselves were the nursing mothers, if they were following Nature, they would be protected from those large families which they force upon the world. If they were doing their duties instead of following their meandering pleasures, they would be raising a race which would be higher, not lower than themselves, and would be conferring true advantage on the nations to which they belong. A more miserable “strike” than that of these Viennese foster-mothers scarcely belongs to the present century. It is not a strike for honour, for means, for necessity, for usefulness. It is degrading to the women who strike ; it is shameful to the women who submit to the terms of the strike ; it is heartless to two children, at least, in every instance ; and it is ruinous to the health of the world. We are told sometimes that the Viennese of all classes are susceptible to the influences of English life. Be it so. Let our English matrons, as teachers and exemplars, be the more sedulous to become mothers of infancy as well as of birth.

NEW BELLOWS FOR ARTIFICIAL RESPIRATION.

MESSRS. KROHNE AND SESEMAN have recently constructed for me the simplest, most trustworthy, and easiest managed bellows for artificial respiration I have, as yet, invented.

The bellows, as shown in the engraving, consist of a small pair of bellows provided with two nozzles, each containing a valve acting in opposite directions to each other, and so arranged that when the bellows are opened they draw in air,—that is to say, exhaust from one nozzle,—and when the bellows are closed



they throw out a current of air from the other nozzle. Each tube terminates in a nostril tube of suitable shape to fit nostrils of various sizes.

In employing these bellows for artificial respiration the patient is placed in the recumbent position, or with the head downwards. An assistant then inserts the nozzle of the exhausting tube, which is marked “exhaust,” into one nostril, holds it there in position, and closes the free nostril between his thumb and finger, the mouth also being closed. The operator now makes a few strokes of the bellows, by which the lungs are emptied of their contained air. The nozzle of the exhausting tube is then removed, the bellows are emptied of the expired air which they contain, and are filled with fresh air. The nozzle of the injecting

tube is next inserted into one nostril, and held in position with the free nostril and mouth closed as before. Lastly, the operator gently injects the chest with fresh air until the lungs are filled with as much air as was drawn out of them by the exhaust movement. This process of alternately exhausting and injecting air can be repeated three or four times a minute, until natural respiration returns. There is no occasion whatever in using the bellows to attempt to follow artificial respiration as quickly as natural respiration; the grand point is to exhaust the lungs of lethal air and to refill them with pure air without disturbance or rough movement of the body. The bellows might be attached with advantage to the operating table, and as they are easily carried they might enter into the bag of the anæsthetist or obstetrician.



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John Howard

*Autotype from a portrait
preserved in the Howard Chapel
Bedford; and, facsimile
Autograph. B.H.*

JOHN HOWARD, LL.D., F.R.S.

I HAVE been led to publish in this ASCLEPIAD a notice of the life of John Howard, from the circumstance that I had the honour to take part, on March 28th last, in the ceremony of unveiling the statue, by Alfred Gilbert, R.A., of the great philanthropist, in the town of Bedford. It was arranged that the Duke of Bedford should perform the act of unveiling this splendid work of art, and that the Right Worshipful the Mayor of Bedford, G. Wells, Esq., should receive the same on the part of the town, from the chairman of the Executive Committee of the Howard Memorial, Mr. Frederick Howard. This was all done with great spirit; but there was another event expected, namely, that the Right Hon. Arthur Wellesley Peel, Speaker of the House of Commons, would deliver an inaugural address or oration befitting the occasion. Unfortunately, Mr. Peel was, at the last moment, prevented by illness from performing a task for which he was, on every account, so eminently qualified. In the dilemma the Mayor and authorities invited me to the ceremony to undertake the duty. It was an impromptu duty, discharged in the speech herewith supplied as an introduction to the biographical details of the life of a man who, though

not technically a medical man, was so skilful in medical and sanitary studies, we may almost claim him as of our fraternity.

INAUGURAL ADDRESS.

“Right Worshipful Mayor, your Graces, my Lords, Ladies, and Gentlemen,—It was a perfect idea that the first commoner of England should have spoken to you to-day about one of the most illustrious commoners England has ever produced, and I throw myself on your forbearance in an endeavour, feeble as a passing shadow, to perform at your request, and on briefest notice, the duty. It is not want of knowledge of John Howard that makes me hesitate, for his work is familiar to me as a household word, through his best, his truest biographer, my late friend, Mr. Hepworth Dixon, whose widow and life-helpmate attends our ceremony to-day. There is also this further bond, that to me as a sanitarian, teaching for forty years that national health is national wealth, and that bodily and mental health are one and the same, the labours and writings of this illustrious man, whose memory we now celebrate, have been foundations of scientific research, gospels, if I may reverently say so, of sanitary faith and practice. Enough! you may be tempted to exclaim, enough to prevent embarrassment. No, not enough. For the mightiness and the mighty results of the work of John Howard are too overpowering to be approached in a few words. I listen back to the most eloquent of voices of his own time, to words such as none but Edmund Burke could utter:—‘He has visited all Europe—not to survey the sumptuousness of palaces or the stateliness of temples; not to make accurate measurements of the remains of ancient grandeur; nor to form a scale

of curiosity of modern art ; nor to collect medals ; nor to collate manuscripts,—but to dive into the depths of dungeons ; to plunge into the infections of hospitals ; to survey the mansions of sorrow and pain ; to take the gauge and dimensions of misery, depression, and contempt ; to remember the forgotten, to attend to the neglected, to visit the forsaken, and to compare and collate the distress of all men in all countries. His plan is original, and it is as full of genius as it is of humanity.'—Yet even this tribute of eloquent respect and affection falls short of the full reality. The distinguished sculptor, Mr. Alfred Gilbert, who has produced the work which you, Mr. Mayor, are about to receive for the town over which you so right worthily preside, has felt the difficulty of the way in which he should present his subject to the present and the future. With the spirit of true genius, having no better guide, he has clothed your philanthropist with the attributes of strength, contemplation, action. All three are embodied in his figure ; strength, thought, life, breathe in the form before us, and carry their wonderful suggestions. Perchance, the figure is recalling the love of that dead wife with whom frankly, before marriage, he struck the stern bargain that in all disputes his voice should rule, but who ever afterwards was the minister of her every wish, every desire of her heart attuned entirely to his own. Perchance he may be meditating on a day soon after his election (at great risk to his fortunes) to the post of High Sheriff of Bedford, when he was first tempted to look into the prison at Bedford, and seeing the monstrous iniquities perpetrated there, resolved to visit prisons within reach of his industrious mind and body with the hope of exposing evils and removing them. Perchance his mind

is dwelling on some scientific problem, on some choice work of art or some joyous landscape he has seen ; or, perhaps, like his predecessor, the immortal dreamer of the prison, he is musing on the world to come, the golden city, or the interminable lake of never-ending fire. Whatever may be the meditation, the artist has wisely determined to let contemplation play the chief part, knowing well that the resources of art, concentrated on one subject, however grand, are limited. Had the admirable skill of the artist been unlimited in regard to form and pose, what endless John Howards he could have modelled out for our delectation. He might have depicted a firm, erect, proud prisoner in the French prison at Brest, where his flashing eye struck absolute terror into the hearts of his custodians, although his life was in their hands. He might have depicted him casting his grasping courageous glance on the blood-red chamber of the Spanish Inquisition at Valladolid, on the painted cap, the robe, the stool of the victim ; on the throne of the chief inquisitor, on the horrid picture upon the walls of ninety-seven victims marching in procession to the flames ; or, demanding of the Fathers of the Holy and Apostolical place that he, John Howard, might, for the sake of truth, be permitted to spend a month as a prisoner in one of the pitiless, bedless, seatless, lightless, breathless, and almost foodless cells, in which at that very time, for three years at least, many living victims were rotting out their existences. He might have depicted the undaunted explorer in foul dens detecting how death in one den raged always in rapid fever flame ; in another killed by slow exhaustion, stealing drop by drop the vital powers. He might have depicted him firm, jubilant, thankful, at the bar of the House of

Commons, receiving the thanks of the representatives of the nation. He might have presented him by the couch of a dying girl in Russian Tartary exposed to the deadly poison that laid him in the dust. He might have offered him as the triumphant martyr anticipating the grateful thanks of mankind for blotting out stains and pains inflicted in the name of justice, by man on man ; or as one listening with far dearer hope than any human tongue could express for the voice from the skies, Well done ! The artist has, I repeat, wisely summoned all his genius to represent strength, contemplation, action,—for these were Howard's trinity of heavenly virtues. Inspired John Bunyan, richer in imagination, sends forth a hero of the mind to face dangers, overcome difficulties, and gain the diadem. Howard goes forth alone, himself the pilgrim, the martyr, and the victor. Strange in fate, that one town should be the home of two such representatives of tribulation, conflict, glory. Strangest of all is the miracle which Howard wrought. Before his time the prisons of our country were the foci of the foulest of foul diseases, of idleness, of crime. Now, though still prisons, they are the purest centres of physical health, homes of industry, and in time to come schools of a newer and better life, until they cease to be required.

“ It is often the fact that the miracle-worker is forgotten in the commonplace of his success. But in the case of John Howard, in him we would fain let the miracle, the marvellous presentment of strength, contemplation, action, live on. A strength nourished on a simplicity itself a marvel ; a strength extracted from the first-fruits of the earth, without one grain of artificial aid from foods that irritate and drinks that burn, corrode, weaken, kill. *A strength* of mental quality that knew

no distinction between self and humanity, and treated even possession as a trust. Strength of real philanthropy laid in nature, eternal as herself, and that carried its owner, unprotected, through thousands and thousands of miles, perils, trials. *A contemplation* that reckoned up human character from environment; that discovered how many men, accounted good men, fostered crime by the means they took to prevent it; and that inculcated progressive civilisation, by the study of principles before practices, prevention before cure. *An action*, mental and physical, perpetually tending towards the highest good in the swiftest time compatible with the noblest industry.

“Mr. Mayor, we call this event a ceremony: let us call it a consecration? In the wilderness of this world we have set up a sign. It is that of a figure touched with celestial fire, like the allegorical pillar leading to the land of promise. May it remain a beacon to ourselves, to our children, to their children, to all passers-by in the wilderness of this world, and to the honour of Bedford—for evermore.”

EPITOME OF THE LIFE OF HOWARD.

It has been an endeavour of mine many times to trace out the birthplace of John Howard. A spirit of curiosity has prompted me to this endeavour, a spirit possibly caught from his very best biographer. During the short stay at Bedford on the memorial festival above referred to, I made fullest inquiry there whether anything new had been discovered on the subject,—to obtain nothing new, but to read a criticism that Bedford had no right to claim him as one of her distinguished children. In plain fact we do not know the date of his birth within four years—1724-7—and out of

four places—Hackney, Enfield, Clapton, and Cardington—we fail to make sure of any one of them as a birthplace. Dixon adds to the difficulty by the not unnatural suggestion that as Howard's father, also John Howard, lived for some time in Smithfield, the illustrious son may have been born in Smithfield. No register, however, tells us, and by inference alone we gather that he came into the world in 1725. Howard himself says not a word relating to the event of his nativity. There was scarcely anything personal to himself and lying between his own existence and the world that concerned him. He left no memoir, he left nothing but his noble deeds for history. I do not think he was right in this matter, for truth made memorable by life ought ever to stand above inclination, even above inclination towards self-repression and modesty.

Whatever his origin, he was born holding an old Saxon name; one of a family belonging to a garden or enclosure. Dixon says that from the equator to the pole where the name of Howard should be pronounced, twenty hearers of the sound—understanders, of course—would instantly think of the “Martyr of Humanity” and the family of the Hereditary Earl Marshal of England. To which observation he adds, “No—let Howard stand alone.” I scarcely agree. There is much in John Howard and the “Martyr of Humanity” that is in common, nay, that is the same. And are not mental qualities “atavistic,” if I may use such a word? Let it pass. John Howard was born as the son of a previous John Howard, a merchant, who in his time was a well-to-do man, about to retire from business, and luxuriating in three residences at least; one at Hackney, one at Enfield, and one at Cardington, by Bedford. His mother, bearing the maiden name of Cholmley, died

when he was young, and he, the son John, if he were not born at Cardington, was nurtured as a motherless infant in that retired spot. He was a feeble child, took to his lessons slowly, spent seven years at the school of the Rev. John Worsley, and departed thence "not fully taught in any one thing," as he himself testified. His next removal was to the school of Mr. John Eames, in London, Eames being a man of note, a Fellow of the Royal Society, a friend and, in a certain sense, an assistant of the immortal Sir Isaac Newton. Under Eames he obtained a good serviceable education, not classical but most practical; good French, good geography, good knowledge of men and things, fair knowledge of scientific facts, and clear common sense. To a man so armed, Latin and Greek may be and are accomplishments, but they are not essentials to highest success, and they sometimes, when they are much forced, generate a false pride which stands against success, making great men prigs and little men fools or conceited idiots who want to take the first places in the world, and, not daring to, dance attendance round the truly great or are the tools of superficial knaves, who pretend admiration and take advantage of imbecility.

Howard's education had none of these faults. Like all good men, he learned what Nature had constructed him to learn and no more. He did not blame his industrious mind because it didn't know what it was not born to acquire; but, feeling sure that Nature intended a good variety of minds as she intends varieties of fruits and flowers, that the world may be sweetened and variegated, he accepted his own advantages with his own defects, and trudged on feeling none of the bitterness of jealousy, and working away with all his

heart amongst all sorts and conditions of men, the friend of all in his own time and in the future ; a grain of the true salt of the earth.

John Howard left Mr. Eames' Academy, date unknown, with little appearance of any distinguishing trait. Dr. Price, whom I shall one day hope to notice at greater length in these pages, and who became one of the first founders of our modern appraisers of the value of life from a commercial point of view, was a scholar with him, and became an intimate ally. Next to a good and, there can be little doubt, sound education, he was well fitted for entering upon the broad road of life, for following his father as a merchant of good degree. He was apprenticed to Messrs. Newnham and Shipley, grocers, of Watling Street in the City, the premium paid down for him being seven hundred pounds sterling. The business was wholesale, leading those in it to a wide and extensive knowledge of, and close intercourse with, many men, many places, and many things. I infer, from occasional expressions he himself lets fall in the after work of his life, that trade, though not strictly congenial to him, was not oppressive, and that during the term of his apprenticeship he devoted himself patiently and sedulously to his vocation. Happily and unhappily, he never finished his probation. When he was about seventeen years old, his father died—date of death, September 9th, 1742—leaving him quite independent, and residuary legatee of the paternal property, with certain reserves for his sister, so soon as he should be twenty-one years of age. To guide him were three trustees, Lawrence Channing, Joe Whithead and Lewin Chalmley, who were so confident of his powers to manage his own affairs they

left him practically the monarch of all he possessed, immediately that the first disposals of the property—and it was a large property—were carried out.

Howard, now rich, was soon freed, by mutual arrangement, from the bonds of apprenticeship. He repaired the old house at Clapton and, having always a turn for travel, he started out on the grand tour through France and Italy. His tour lasted about two years, and on his return to England he located himself, not at Clapton, but at Stoke Newington, then a lovely village, noted for its salubrity.

And here there appears a bit of personal history about Howard which mounts to historic drollery, in matter of love and marriage. Howard, a young man disliking the landlady of the lodging he first took, transferred himself to another lodging, kept by a widow lady, Mrs. Sarah Lardeau, fifty-two years of age, and the relict of a clerk to a white lead manufacturer. The lady had no beauty, no soundness of health, no fortune, no learning, no high quality of mind, that should tempt a rich man of twenty-five, given to melancholy and to a kind of poetic inspiration; a man fond of riding out alone, whilst his horse grazed by the way side, or of lying down by a tree or brook rapt in contemplation of diverse things; love, let us suppose, inclusive. Yet, strangely, this good and matronly lady, sweet of disposition certainly, devoted in her attention to the youth, still weak and despondent, bordering, some said, on consumption—she, a mother to him, won his young heart unwittingly, so that, like Cæsar, he came, saw, and conquered. His conquering was not smooth, however—"the course of true love never does run smooth," and the victory only came after his solemn declaration that if she said no to his offer he

would be an exile for ever to his family and friends. What could a feeling woman do but give way? How could a widow of fifty-two bear the weight of such an exilement? She did not bear it; she kept the would-be exile at home by giving herself away and becoming Mrs. John Howard number one.

Mrs. Howard lived about three years—lived to know that she had obtained one of the kindest of husbands, who, tending her with the sweetest care up to her death, laid her finally to rest in St. Mary's, Whitechapel, and, himself broken-hearted, left Newington, passed her little savings over to her sister, presented the bulk of his furniture to the poor of the village, and retired for a time to a lodging in St. Paul's Churchyard, not, under the circumstances, an inappropriate site.

I referred in my address to the manner in which Howard overawed the French soldiers at Brest. The fact is connected with a bit of his life which occurred soon after the death of his wife. He had started out for Portugal in the ship *Hanover*, for the purpose of seeing the remains of Lisbon after the great earthquake there in 1755. On his way, the *Hanover* was made prisoner by the French, and he was carried first to Brest, then to Morlaix, then to Carpaix; from which latter place he was, after a residence of two months, allowed to return to England, in fair health, but destitute of money and the common necessities of good food and decent attire.

From the moment of this eventful return to his native country, John Howard took rank to the title of "Howard the Philanthropist." He had witnessed, in his captivity, the horrors of captivity, and his first efforts were devoted to the care of those he had left behind bearing the captive's curse. His labours were

successful in liberating many other prisoners, and, a little later on, as if weary of London life and society, he went back to the home of his childhood at Cardington, near Bedford, his fondest English home. This was in the year 1756, from which time up to 1758 he was once more a student, and, in the end, once more a lover. Henrietta Leeds, of Croxton in Cambridgeshire, daughter of Sergeant Leeds, a barrister of some position in legal circles, crossed his vision. To her he proposed, and her he married on April 25th, 1758. Dixon, describing her with "her portrait before him," says, "It has about it a look of home—a quiet suggestion of domestic love and peace." In a brief sentence, his affection for her, and hers for him, was sealed till death did them part, which it did on Sunday, March 31st, 1765, four days after the birth of their first and only child, an unhappy boy, to whose sad fate it will be necessary to refer later on. The happiness of John Howard with his second wife appears to have been complete, notwithstanding a bargain struck by him before their marriage knot was tied, that in all matters on which there was difference of opinion between them "his voice should rule,"—may-be one cause of the happiness.

The course of his life now at Cardington was serenely beautiful. He was a student again, making visits to the metropolis and gaining friends—largely, it may be supposed, through Dr. Price—among scientific and learned celebrities of the day. On May 20th, 1756, he was elected a Fellow of the Royal Society, to which learned body in 1764-5 he sent a paper, published in the fifty-fourth volume of the *Philosophical Transactions*, at page 100, under the title, "An Account of the Degree of Cold observed in Bedford-

shire." The paper shows the fact that his studies were warmly meteorological, and tradition tells us they were coldly so as well as warm; for I remember my late attached and most able friend, Dr. Herbert Barker, of Bedford, taking me some forty years ago to the Howard garden at Cardington, and, in company with the late



HOWARD'S HOUSE AT CARDINGTON.

Mr. Samuel Whithead, showing me the place where, at an observatory Howard had built there, he kept a Fahrenheit's thermometer which, winter and summer, he rose every morning at two o'clock to read off and register in his table of temperatures.

Mrs. Howard's health appearing to necessitate a change, Howard bought a cottage at Watcombe in the

New Forest, and there the two spent nearly four years happily and very much esteemed by their neighbours ; but the place not suiting Mrs. Howard they returned to Cardington, re-embellished their house, and fell back upon old pursuits, largely improving their estate with new and wholesome cottages for the poor, and by every means in their power bringing health, happiness, and content to all who, more or less, were dependent on them. They were advanced politicians. They held that property had no right to add to wealth by accumulation, and that the surplus of one who had enough must be distributed to those who had not enough,—a modest socialistic theory, which, practised faithfully, might have been, at the proper and earlier time for its development, the remedy for many woes pending and yet to come in our present revolutionary epoch.

There occurs now a chapter in the life of John Howard which Dixon, to whose masterly pen I am deeply indebted, has dwelt upon with much tenderness. It dates from the second Mrs. Howard's untimely death, in 1765, up to 1770, when the still mourning widower was elected to the office of High Sheriff of Bedford, with the duties of which office his grand work in the improvements of prisons commenced. The period extends over an interval of five years (1765-70), and is one of continued restlessness, travel, and endeavour to bury the sad past in variety of place and action. It begins in Bath, where he conducted some researches—which were communicated to the Royal Society—on the Bath waters. It includes a journey to Holland, another one to Italy from France, with seven days spent in crossing the Alps ; a kind of holiday at Geneva, and some days at the “dirty city of Paris,” where “the streets were so narrow, with no

footpaths, that there is no stirring out but in a coach ; and as to the hackney coaches, they were abominable." Through many "desolate places of ancient grandeur" he thus wiled away his time. In July 1770 he got to Heidelberg, and in September of that year, passing to Rotterdam, he once more found his way home, "very desirous of returning with a right spirit, not only wiser but better ; with a cheerful humility—a more general love and benevolence to his fellow-creatures ; watchful of his thoughts, his words, his actions ; resigned to the will of God, that he may work with God, and lead a more useful and honourable life in this world."

He returned to Cardington, and in 1773 was put forward as High Sheriff of Bedford. He did not court the office ; it was one of those trusts that will, from time to time, come of a surety to powerful men, and by bold and honest men will be accepted, although opposed to their tastes and pleasures. In Howard's case it was, singularly and uniquely, a bold acceptance ; for he, an Independent in religion, could not, in accordance with the then existing infamous Test Act, receive the Anglican Sacrament before entering office, and exposed himself, therefore, to the risk of the heavy fine of £500, with many of the most serious social disqualifications. He accepted the risk.

And now the greater life of John Howard commenced. Literally he went to prison, but never as prisoner had gone before, of his own free will and mere motion. It was his duty as Sheriff to hear the trials of prisoners at Bedford ; it was also his duty to visit the tried and condemned in their prison. The prison at Bedford was a centre of shame and, I had almost said, infamy. It was not worse than many other such places, but it did well as a bad model. It was the prison in

which John Bunyan, with many privileges, had lain twelve years, and had suggested so much that is now immortal, so we must not say too much against it; but it was a bad, very bad place. Howard's first description of it, from which all his others were born, tells the story of his enlightenment. He saw innocent men and women, whom the law, after trial, had declared innocent, or whom a grand jury had acquitted, sent back to prison till they could pay the gaolers' fees. He proposed a county rate to meet this crying evil; and his brother magistrates wanting a precedent, he travelled from county to county to find one. He found no such thing, but he did find, in the prisons of his own country first, and, in time, of other countries, such mountains of misery as to make one behold a human race without common knowledge of the first elements of civilisation. Thence onward he devoted all his life to the teaching of a better discipline—illumined it with all the enthusiasm vulgarly called fanaticism, and closed it with all the heroism of the noblest martyrdom.

THE WORKS OF JOHN HOWARD.

Two papers for the Royal Society written by Howard have already been noticed. They are of minor moment. His lasting work is that on prisons and hospitals. In this we find him nearest to our highest, grandest branch of medicine. Here he plays the true part of the good physician. As we, in our practice, go from bed to bed looking at the diseased in their sick chambers, so he went from county to county, country to country, to see the disease of crime in order to cause its prevention—to study its treatment, prevention and cure.

The description of Burke, already quoted, is a sufficient stamp of his labours and their rewards. Let it suffice

for me to say that he traversed these islands far and wide investigating the state of the prisons; that he drew up a report of them; that he was examined as witness respecting them before a committee of the whole House of Commons; that he was called to the Bar of the House to receive from the Speaker the message that "the House is very sensible of the humanity and zeal which have led him to visit the several gaols of this kingdom, and to communicate to the House the interesting observations he has made on the subject"; that his labours were crowned with eminent success here; and that later in his life, on the continent of Europe, his unflagging zeal in the same direction made him one of the wonders of the world of philanthropy and progress.

This told, let me add one or two of the observations of a sanitary kind, which are of some value to us even in this generation, and will probably remain of interest when many other generations have passed away. It will be gathered from these brief extracts in how many ways he anticipated certain of the great sanitary reforms which have not, until quite recent dates, been carried into execution.

THE CAUSE OF GAOL FEVER.

"If it were asked," he says, "What is the cause of the gaol-fever?" it would in general be readily replied, 'The want of fresh air and cleanliness.' But as I have found, in some prisons abroad, cells and dungeons as offensive and dirty as any I have observed in this country, where, however, this distemper was unknown, I am obliged to look out for some additional cause of its production. I am of opinion, that the sudden change of diet and lodging so affects the spirits of new convicts, that the

general causes of putrid fevers exert an immediate effect upon them. Hence it is common to see them sicken and die in a short time, with very little apparent illness. Convicts are generally stout, robust young men, who have been accustomed to free diet, tolerable lodgings, and vigorous exercise. These are ironed, thrust into close, offensive dungeons, and there chained down, some of them without straw or other bedding; here they continue, in winter, sixteen or seventeen hours out of the twenty-four, in utter inactivity, and immersed in the noxious effluvia of their own bodies. On this account the gaol-distemper is always observed to reign more in our prisons during winter than summer; contrary, I presume, to the nature of other putrid diseases. Their diet is at the same time low and scanty; they are generally without firing; and the powers of life soon become incapable of resisting so many causes of sickness and despair.

“ On my visits in 1779, I found only one person ill of the gaol-fever; he was in Newgate under sentence of death. In 1782, I did not find a single person labouring under that disorder throughout the whole kingdom. But in 1783, when the prisons became crowded in consequence of the peace, I was sorry to observe, that through the original faulty construction of many of them, and the want of attention in magistrates properly to inspect them, and enforce the orders of the Act for preserving the health of prisoners, they were beginning to return to their former wretched state.”

In more than one place Howard dwells on the important observation that confinement alone, that overcrowding alone, was not sufficient to light up the specific gaol-distemper. There was wanted for it some specific cause; then it spread like fire, and, fed by the

impure condition, became a plague before which the officers of the courts of justice, the members of the Bar, nay, the Bench itself, sometimes fell.

CONSTRUCTION OF HOSPITALS. .

“The situation of an Infirmary or Hospital,” he tells us, “should be on elevated ground, near a stream of water, and out of a town. The wards, if only one for each sex, from twenty-five to thirty feet high, arched, and without apartments over them; otherwise, the building to consist of only two stories beside the cellars, and the area extended as far as necessary upon this plan, that the inconvenience of higher rooms may be avoided. The first floor raised four or five steps from the ground, and the ascent made easy to the entrance. The wards fifteen feet high to the ceilings, and distinct ones for medical and chirurgical patients. Two doors to each ward, one of them iron latticed, or canvas. Staircase of stone, spacious, convenient, and easy, as in Italy, Marseilles, Malta, etc. No room to contain more than eight beds. The windows lofty and opposite, or large circular apertures (as at Leeds infirmary) opening into passages not less than six feet wide: hasps and staples to the upper sashes to prevent their being shut at improper times: one of the windows should open from the ceiling to the floor, either as folding doors, or like those at Guy’s hospital: a stone gallery for more readily opening and shutting the windows, as in the Italian hospitals. The ceilings lathed and plastered, and proper apertures in them. The fireplaces in the middle of the longer side of the wards; the beds in spacious recesses, as at Toledo and Burgos; or to each bed a recess with curtains, as at Genoa, Savona, etc. The bedsteads iron, painted, and with a screw, that the

backs may be easily raised or lowered ; the beds on varnished boards or laths, with hair mattresses. In each ward a cistern, basin, and towel for the patients. Vaults on the outside of the wards and water closets, as at Guy's hospital : for every improvement that may render such places less offensive should be carefully adopted in all houses containing a number of inhabitants. Airy rooms and refectories for convalescent patients ; one spare and unfurnished ward, each ward to be taken in succession, and called the spare ward. The kitchen, wash-house, brew-house, and bake-house, out of the house ; but if the kitchen be in the house, it should be lofty, as in Christ's hospital (not underground), and the entrance through the servants' hall. A convenient bath with an easy descent into it. A piazza and spacious walk to induce patients to take the air and exercise. The wards washed once a week—scraped and lime-whited at least once a year. 'The machines at Northwich for supplying the salt mines with fresh air, being on a simple construction, would be of admirable use in hospitals, especially if situated in close and confined places.' The patients washed at their admission in the cold or warm bath, and to conform strictly to the rules of nicety and cleanliness."

"It may be proper to suggest, that many of these ideas may be adopted with equal propriety in the construction and regulation of poor-houses."

EDUCATION IN IRELAND.

"I cannot forbear," he continues, "expressing a wish that the benefits of education were more generally extended over Ireland than they are. If free-schools were instituted in every parish for instructing in the lower parts of learning, and the principles of morality,

to children of each sex and of all persuasions, it would perhaps more than anything tend to soften the manners of the Irish poor, and enable their youth to resist the various temptations to vice, to which they are inevitably exposed in their crowded huts and cabins."

The lower class of people in Ireland are by no means averse to the improvement of their children. At the cabins on the road I saw several schools, in which, for the payment of 3s. 3d. Irish per quarter, children were instructed in reading, writing, and accounts. Some of these I examined as to their proficiency, and found them much forwarder than those of the same age in the charter schools. They were clean and wholesome, and consisted of the children of both Protestant and Catholic parents. I hope I shall not be thought, as a Protestant dissenter, indifferent to the Protestant cause, when I express my wish that these distinctions were less regarded in bestowing the advantages of education; and that the increase of Protestantism were chiefly trusted to the dissemination of knowledge and sound morals."

The above is but one of many quotations in which it was maintained that education was the great curer of national misery. Howard was specially strong in his belief that sound and free education was the most powerful of all aids for mental as well as physical evils. Crime and disease, in his view, went hand in hand.

BAD EFFECTS OF ALCOHOLIC DRINKS.

"Art," according to John Howard, "never made so fatal a present to mankind as the invention of distilling spirituous liquors, and they are seldom or never a necessary, but almost always a pernicious article in the diet of men in health. I cannot but look with

peculiar satisfaction on the confirmation this opinion receives by the events in these narratives."

"The temporary glow and elevation caused by spirituous liquors are, I imagine, very fallacious tokens of their good effects; as they are always succeeded by a greater reverse, and tend rather to consume and exhaust, than to feed and invigorate, the genuine principle of vital energy. Another extremely pernicious effect of these liquors is, the indolence and stupidity they occasion, rendering men inattentive to their own preservation, and unwilling to use those exertions which are so peculiarly necessary in situations like those described in the foregoing narratives."

If evidence of the value of abstinence as inculcated above were further wanting, we find it in the life and exertions of Howard himself. In all his travels, in all his dangers—and travels and dangers in his day were indeed serious—in all his anxieties, sorrows, difficulties, he kept up a strong heart, a serene mind, and a courageous activity under the most rigid rule of abstinence from all pernicious stimulation.

SHORTENING OF LIFE BY GAOL CONFINEMENT.

The gaol at Chelmsford he describes as "white-washed and clean. No bath. Acquitted prisoners are kept in irons till the judge leaves the town, unless the fees to the clerk of the Crown be paid. Forty convicts here (some of whom had been under sentence of transportation three or four years) regularly receive the king's allowance of 2s. 6d. a week. In many other gaols the convicts have only the county allowance; and several gaolers have observed, that when released after long confinement, they seldom live above a year or two."

LAST DAYS OF JOHN HOWARD.

In the quotations given above we learn a little respecting the sanitary labours of Howard. It is indeed a little, but it is a good specimen of the work of the man to whose last days we must now speedily come. His whole life was in the end devoted to travel, and to examinations of gaols, penitentiaries, poor-houses, and homes of the poor in great and crowded cities. He was not content with England and Ireland, but must needs pass on to the continent of Europe and traverse that continent from one point to another, shunning no danger, avoiding no fatigue. His mode of life, simple to such a degree it was a wonder to the wealthy in those days, was by no means penurious. When he came to a town he chose the best hotel, and ordered the best meals that could be obtained, but he himself ate no flesh and drank no strong drink. The table was laid out for him as if he were going to dine sumptuously, on one condition, that no one was allowed to wait upon him except his servant, Prole, who, as soon as they were alone, removed all the viands to the sideboard, and made his master a bowl of bread and milk, which was considered amply sufficient for all his needs. Travelling about forty miles a day, he carried with him some dry biscuit, which, with some milk from a cottage, or a draught of fresh water, for which he would pay as he went along, he was perfectly content. At the different places where he stayed to inspect prisons, at home or abroad, he entered into all dangers without a thought of his own safety. Fever did not alarm him; fatigue and inclemency did not affect him; the passions of prisoners gave him no anxiety; and, although he was always courteous to authorities, from servants and

officers to ministers, kings, and emperors, he never hesitated to speak his mind and tell the truth at all risks. These self-sacrificing and courageous traits gained for him universal respect. He told his full mind; he showed to those who ruled how they made crime and afterwards punished it,—a proof that they themselves were the authors of crime rather than the removers of it. It would, perhaps, not be fair to say that he was completely emancipated in his views on the subject of punishment: he does not seem to have been prepared for the abolition of capital punishment, but he fought valiantly for the reduction of it as a practice, and opposed torture with his whole heart and soul.

Once in the course of his life he was led away by the political mirage. He was tempted to stand for Bedford with Mr. Whitbread, and, most fortunately, was defeated; for certain it is that if he had entered Parliament some of the grandest achievements of his life would have had no existence.

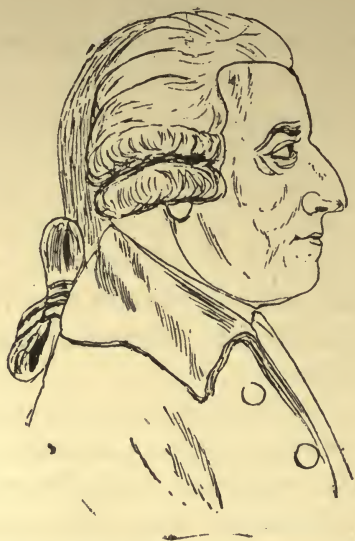
Keeping him in our minds as a wanderer in the world, always for some great and beneficent object, we follow him until July 1789, when we find him leaving this country for a final tour on the Continent. He reaches Russia, and arrives at Kremenschuk on the Dnieper and thence to Cherson in Russian Tartary, where he hears with delight of the fall of the Parisian Bastille. At this time fighting was going on between the Sultan and Imperial Russia. There had been a great Russian victory, and Cherson was rejoicing. But victory was attended, as is so often the case, with a furious outbreak of disease, and amongst its victims was a young lady who lived about twenty-four miles from Cherson. Her life was in the balance, and

Howard, as if he were a real physician, was summoned to her bedside, at the special request of his friend Admiral Mordvinoff, who accompanied him. The young lady seemed to improve under his treatment, and he returned to Cherson. He was called again to her aid, and, amidst fearful storm and rain, set out, once more, on his mission of mercy, riding a dray horse because he could get no better means of conveyance. On his arrival he found his patient in the hand of death, but he stayed with her for some hours, returning to Cherson afterwards, apparently but little indisposed. Gradually he began to suffer at intervals from pain, and finally lapsed into fever, from which he died. His last act was the perusal of a letter, sent from a friend in Leicester respecting his son. The letter said that the boy had greatly improved. "Is not this comfort for a dying father?" was the last connected sentence of the dying philanthropist.

In person John Howard was not a strong man to appearance, yet his strength was persistent in a measure little known. His appearance will be gathered from the portrait which forms the frontispiece of this ASCLEPIAD. His modesty was such that he would never sit to a painter, but one day while seated in the chapel which he attended in Bedford, now called the Howard Chapel, a fellow-worshipper drew a sketch of him, which has been preserved with scrupulous care, and I am deeply indebted to the authorities of the Howard Chapel for obtaining permission for Mr. Drury Stowe of Bedford to take a photograph of it, from which the autotype. To my good friend Mr. Rowland Hill of Bedford I am also indebted, not only for assistance rendered in regard to the photograph, but also for the subjoined sketch of another portrait prepared for the *Bedford Mercury*,

and published on the day following the unveiling of the Memorial.

All men have enemies, the best men as well as the worst, and John Howard did not escape. "Be thou white as snow thou shalt not escape calumny." It was urged against him in the calumnious way that he



PORTRAIT OF HOWARD FROM "BEDFORD MERCURY."

in his ardour for philanthropy neglected his son, an unhappy boy, whom he loved and cared for to the last. The more this story is looked into, the more certainly it fails to carry conviction. Young Howard was not for one moment neglected by a parent who laid down his life for his kindred, and whose love for all children of men was as great as his fame.

ORIGINAL RESEARCH, EXPERIMENTAL AND INDUCTIVE.

"Dire n'est rien ; faire est tout."—RENAN.

PHYSICAL RESEARCHES ON NERVOUS MATTER.

PART I.

INTRODUCTION.

PROBABLY no parts of the bodies of men and animals have been more carefully dissected and studied than the brain and nervous systems. The anatomist has been at work on them from the earliest date of anatomical research. Their structures have been explored—re-explored,—and by the most varied, sometimes childish, names described. In later times the chemist has been as busy as the anatomist, and in our day one of our cotemporaries, Dr. Thudichum, has published perhaps the most remarkable series of analyses on record bearing on the chemical constitution of nervous matter. The experimental physiologist has also played his part. He has investigated by analytical experiment the functions of particular structures in the brain, the spinal cord, the cerebro-spinal ganglia, the sympathetic ganglia. The microscopist has lent a helping hand, and has discovered and depicted for us minute construction-cells, fibres, vessels, in the fullest degree.

The pathologist has followed the microscopist and, with infinite patience and skill, has made for us preparations and sections that are really astonishing in their character, aids to diagnosis which cannot be over-estimated. Lastly the psychologist has taken his turn, and by study of diseased structure, side by side with phenomena of mental act and condition, has brought up our knowledge of natural function and deranged function to an excellent standard.

But whilst all this has been in progress one research on nervous matter seems to have been neglected or omitted; I mean the most simple, the most elementary—the physical qualities of the nervous structure; the nervous structure as an instrument, or medium, fitted for particular and common purposes. When we are passing through the streets we see the bodies of dead animals, divided in half, suspended outside the shops. There is the divided brain, and there is the spinal cord running down the bony canal. The structures look very commonplace. There is nothing beautiful or striking about them. The works of a timepiece, of a dynamo, of a steam engine, are infinitely more wonderful to the ordinary gaze than these animal mechanisms which are cut to pieces or sold without ceremony or surprise. The cord is torn from its bearings and cast to dogs, or trodden under foot; the brain is treated little better; yet as instruments and mediums these are the most precious and marvellous that ever were developed or fabricated. Centres of life and of living powers. In what way?

In what way? That is the question which has arisen so often in my mind that I have thought it worth while to ask of nature a few questions about it. I question her with the simplicity of a child and look

earnestly in her face for a reply,—the best mode, as one of my masters tells me, to follow. If any one considers the plan too simple let him not read.

THE COMMON PHYSICAL QUALITIES OF NERVOUS MATTER.

The nervous substance differs from other substances in that it is colloidal, fatty, saline, aqueous. Muscle, in the healthy state, is colloidal chiefly ; bone is colloidal and saline ; membrane is colloidal. Nervous substance is a combination of these substances combined with water. The ancients no doubt reckoned nervous matter as amongst the solids, and in their hypothesis of the pathology of the solids and of the humours they tried to differentiate in a rude way between static changes seated in the nervous system as well as in flesh and gland, and changes seated in the blood ; one static, the other dynamic. There was much that gave countenance to these views, for while it was obvious that the blood is ever in motion like a living thing, nothing seemed more stable than the nervous matter locked up in membranes and bones, or laid down in what seemed to be solid cords running in every direction like a firm net-work through the body. The early anatomists looked at the nervous centres as they might have looked upon a fortress, and on the blood as they might have looked on the soldiers who manned the fortress, and who moved, laboured, lived, and died at their work. The names they applied to the nervous structures when they came to discover and define them are coloured by this idea. The brain, according to them, was a small world divided into hemispheres ; it had its bridges, its canals, its fissures, its base, its apex, its pyramids. It was a land of life. It was not merely

a seat of power, a mainspring, but truly a fixed thing, in which the moving, living motion or spirit was stored, and from which, through connecting links and lines, all commands are delivered to parts, and are duly executed so long as all is sound and normal. Disturb the solids, and however natural the blood and humours may be, there must be disease. Disturb the blood, and however sound and normal the solids may be, there must be disease.

The great mistake that was made in this matter was concealed by one false observation. It was assumed by the anatomists that the brain and its elongations in the form of nerves were absolutely solid substances; and although at one time it was thought that in the nervous fibre there was a fluid called specifically the nervous fluid, which was supposed to move in the line of the nerve, as if the nerves were a series of tubes or tubules like vessels containing chyle, or blood, and although the tubular character of nerve has been exhibited by the microscopists, with mistakes of observation owing to the circumstance that *post mortem* changes have sometimes been taken as natural conditions—the grandest of errors has remained, that of looking upon the nervous matter as solid.

The brain as we find it after death looks solid. It seems to cut, as Gall said, like cheese. It presents distinct parts which are solid, so solid and so uniform in cast, they can be named, figured, measured, and even weighed. The centres can be traced out as fibres; nerves can be, to some extent, traced into the centres, and in the brain, cavities—ventricles—have been discovered, which hold in them plexuses of blood-vessels and contents of fluids or gases; all

indications, as they would appear, of the solidity of hair and nervous matter.

The first subject that I shall treat upon in these pages, the first point on which I shall argue, is that the nervous matter is not, during life, in the strict sense, solid. It has in it the idea of solidity as we find it after death, but it is not solid as it exists for vital function and activity. It is, as I shall hope to demonstrate, mobile. It is not like a wire, as a conductor of vibration, but is rather like a column of mercury, movable by expansion and vibration of particle on particle, particles collected in centres, and in a certain sense distinct, yet all in communication by means of the connecting lines which rise from the expanses in the organs of sense and from the other surfaces.

OBSERVATIONS.

OBS. I. *Rigor Mortis of Cerebral Matter*.—In the year 1867, when I was making a series of observations on the influence of extreme cold on nervous substance, I discovered that the brain of the living animal could be quickly frozen, and that so firmly that a deep narcosis, with general insensibility, could be induced by the process of freezing it; also, that if the solidification from cold were confined to the true cerebral region, that is to say, if it were not continued down to the medulla, the sleeping, or as it might be called hybernating, animal would continue to live and would return to life when the brain was allowed to resolve under the effect of warmth. In some instances, birds being the narcotised animals, the effect of the cold was extended to the medulla, by which act the function of respiration ceased and actual death suddenly followed. Then, the

cavity of the skull being rapidly laid open, the cerebrum and cerebellum could be removed in so firm a state, from the action of the cold, so frozen, that they resembled ice, but on exposure to warmth thawed and became soft and aqueous; after which they fell quickly into the solid condition in which we commonly find the brain of men and animals after death. These observations led me to the conclusion that during living state the nervous matter is a fluid enclosed within its membranes; that, like blood, it may, in this state, be frozen through its entire fluid mass; but that it holds in its mass a soluble colloidal substance which, under the influence of warmth, after the effect of the freezing has passed away, falls into a state of rest and passes into the coagulated condition,—a condition analogous to the rigor mortis of muscle.

OBS. II. *Suspension of Solidification, or Coagulation.*—I observed that the changes above referred to could be prolonged. After the process of killing a sheep I caused the butcher, directly the animal was dead, to lay the brain open by one swift blow of the cleaver, and at once remove the still soft and aqueous brain organs into a weak solution of ammonia. As the ammonia was very quickly absorbed by the brain substance it held the aqueous colloidal part in the fluid state so that some of it could be gently pressed as fluid into a test tube, and could be retained as such until the ammonia was evaporated, on which the colloidal portion separated in the semi-solid or coagulated form. From these observations I was confirmed in the conclusion that the brain, during life, exists in a different physical state than it does after death; that it is in a more fluid state during life, and that from that fluid or aqueous state it is susceptible

of physical changes towards a solid or less active state under various causes acting upon it; such as, long continued vibrations leading to sleep; pressure from excreted fluids; mechanical shocks; exaltation of temperature; the action of poisonous bodies.

OBS. III. *Brain Pulp*.—The brain of a sheep removed from the skull cavity immediately after the death of the animal was rubbed through a fine canvas gauze. The brain matter came through the gauze as a semi-fluid pulp, leaving behind a small portion of membrane and adherent pulp, one brain weighing 1773 grains, yielding 1736 grains of pulp, with 37 grains or 2·08 per cent. that would not pass through the gauze. The chemical reaction of the pulp was at first neutral to test paper, but soon became acid. The specific gravity of the pulp was ·865, taking water as =1000. The colour of the pulp was reddish white, with numerous minute red points; but after a short exposure to the air the exposed surface became white, as if it were undergoing a surface oxidisation. The change of colour extended downwards to the depth of two or three lines, the pulp below retaining its original hue with the red spots as before. These appearances remained until decomposition set in and rendered the whole mass dark and offensive.

OBS. IV. *Figured Surfaces*.—Brain pulp in its fresh state was poured quickly, several times, from one glass cup into another, in order to observe what form it would settle into after agitation. The form was singular. The surface presented a figured character like a surface of flattened convolutions. The effect was so striking I thought at first it must be an accidental phenomenon; but this was not the fact. Every time the experiment was repeated the pheno-

menon was repeated, often so remarkably that the artificially produced picture could scarcely be told from the natural one when it was cast into the same mould. It was rendered clear, in short, that the tendency of brain pulp is to fall into a convoluted form; in which respect it resembles some other viscous fluids which under agitation take their own special shapes. The character or figuration in this instance was maintained up to the period of decomposition, the outlines of convoluted figuration being well defined for many hours.

OBS. V. *Action of Water on Brain Pulp*.—Equal parts, by weight, of brain pulp and pure water were mixed together and rubbed in a porcelain mortar into an even fluid, which closely resembled cream. A portion of the fluid was then placed in a narrow graduated tube and was set aside at 64° Fahr. After standing twelve hours the column of fluid was found divided into three parts. One part, measuring in volume four inches of the tube, was a whitish-creamy-looking substance floating on the part immediately beneath. The second part, on which the first floated, was a thin red portion, measuring in volume in the tube three inches. The third part below the red-coloured fluid was a small deposit of whitish firm material, which occupied half an inch of the volume of the tube. From the manner in which it floated it was probable that the white semi-solid substance resting upon the red fluid contained the fatty matter of the brain; it was also probable that the heavy substance at the bottom of the fluid was an insoluble material that had undergone coagulation and had gravitated to the bottom. In an after research this probable observation turned out to be true. The red watery fluid, it was assumed, represented the water that had been added

originally to the brain pulp, with which it had not united in any close physical combination; it was, however, found to contain some albumen, together with some colouring principle of blood, the first of which—the albumen—was coagulated and precipitated by heat; the second—the red matter—was discoloured by heat.

These observations suggested that in the natural brain substance, grey and white combined, there are four substances: (1) A colloidal substance, containing some soluble albumen and some insoluble similar body; (2) Some fatty substance which will float on water; (3) Some colouring substance derived from the blood; (4) The normal water which holds all these parts together. The observations indicated further that the normal brain substance altogether is hydrated up to saturation, and is therefore insoluble in water, with the exception of a little soluble albumen, which may have been in process of transmutation into the insoluble condition at the time when the water was added for the purpose of testing solubility. Brain substance seems therefore very much like coagulated blood, but with less colouring substance, and with fat as an additional compound.

OBS. VI. *Desiccation of Brain Pulp*.—A portion of 100 grains of fresh brain pulp was placed in a glass cup and set to dry over sulphuric acid in a specially constructed drying air chamber, the temperature of which could not rise above 115° Fahr. In twenty hours the pulp had lost 44 grains of water. After remaining 6 hours longer in the drying chamber the mass had lost 54 grains of water. After 24 hours' further continuance of desiccation it had lost 63 grains of water; and, on longer exposure, viz., for 32 hours, it had lost 77 grains of water, after which it failed to

lose weight. This specimen of brain therefore contained originally 23 per cent. of solid matter, distributed in 77 per cent. of water. It was observed that in drying down the upper surface of the brain pulp was turned into a solid, resembling the scab that forms on wounds and abraded skin. N.B.—Blood desiccates in a somewhat similar manner.

OBS. VII. *Desiccation of the Spinal Cord*.—A section of spinal cord of a sheep, carefully freed of external membrane and fat, and weighing 100 grs., was placed in the drying oven at 115° Fahr. over sulphuric acid. In 20 hours it was reduced in weight to 63 grs. In seven hours more it was reduced to 53 grs., in six hours more to 40 grs., and in an additional 48 hours to 24 grs. It then ceased to lose weight on further desiccation, and presented a dull-white appearance, and a soft and wax-like consistency, very pliable. It was quite free of decomposition, but on being exposed to the air began slowly to absorb aqueous vapour, and to increase in weight from that absorption. It desiccated again in the chamber to 24 grains, indicating that it originally held 76 per cent. of water, as compared with 77 in the pulp.

OBS. VIII. *Desiccation with Pulverisation*.—A specimen of 100 grs. of fresh brain pulp was very carefully desiccated until it admitted of being pulverised roughly; after which it was re-submitted to the drying stove. When it had been further desiccated it was rubbed into the finest possible powder, or flour, and redried until it ceased to lose weight on further attempt at drying. It then weighed 23 grains, having lost 77 per cent. of water. It rapidly absorbed water from the air and increased proportionately in weight. It was a tasteless powder, yellowish white in tint, and odourless.

These last three observations tally so closely it may fairly be assumed that the brain matter observed upon, as well as matter of the spinal cord, is made up of from 76 to 77 per cent. of water, which in the living state is in the semi-fluid form constituting what is commonly called the "solid" brain and cord.

OBS. IX. *Combustibility of Brain Matter*.—If brain pulp be exposed to the flame of a lamp in the fresh state it will not burn; or if a wick be placed in it so as to make it like a lamp, it will yield nothing to support the flame; but, if the water it contains be removed in sufficient quantity, the brain substance becomes very combustible. One hundred grains of brain pulp were placed in a glass cup standing over sulphuric acid and placed in the drying chamber at 115° Fahr. The specimen was retained in the chamber for 20 hours, when, on being removed, it was found that it had undergone a loss of 44 grs. of water. A portion of this substance was now removed and tested in the flame of a spirit lamp. It began to burn in a slow manner, but repeatedly went out and had to be returned to the flame of the lamp to sustain its combustion. Another 100 grs. of brain pulp from the same store was dried down until it had lost 50 grs. of water, when it burnt brightly, but not for long independently. After it was alight it scintillated beautifully with evolution of combustible gas in clear flame. A third portion of the same store of brain pulp weighing 100 grs. was dried until it had lost 68 parts of water. The substance presented a waxy appearance, and felt soft and waxy to the touch. It burnt brilliantly like a wax taper, without smoke, with abundant scintillations and with slight running from it of an oily fluid, which also burnt very brilliantly. When the com-

bustion had ceased completely, a small carbonaceous residue was collected weighing 2·50 grs.

OBS. X. *Combustion and Deflagration of Brain Matter*.—A specimen of 100 grains of brain pulp, derived from a fresh brain, was placed in a platinum cup and dried down at 115° Fahr. over sulphuric acid, until 77 grs. of water were removed from it, when it ceased to lose weight on further drying. It weighed now 23 grs. precisely, and whilst retained in the platinum cup was subjected to the heat of a Bunsen burner until it was consumed. It burnt with a most brilliant flame, extending, for a short time, two inches above the crucible, and giving forth splendid scintillations. After complete incineration had taken place the carbon residue was weighed in the crucible and yielded, precisely as in the last observation, 2·50 grs.

OBS. XI. *Combustibility of Spinal Cord*.—A specimen of 100 grs. of fresh spinal cord carefully cleared from membrane and external fat was placed over sulphuric acid in the drying oven and left there for three days at 115° Fahr. At the end of this time it had lost 78 grs. of water, being, in fact, completely desiccated. It now weighed 22 grs., and on being subjected to combustion burnt precisely like a taper, but with fine scintillations. It left a carbon residue of 2·50 grs.

OBS. XII. *Point of Dryness for Combustion of Spinal Cord*.—Another specimen of 100 grs. of spinal cord was dried until it had lost 37 grs. of water. It was now tested in the flame, but would not burn as a flame although it slightly detonated. Reduced by further drying until it had lost 47 grs. of water, it burned scintillating freely. Reduced to a loss of 60 grs. of water, it burnt well, sustaining a good-sized flame

with scintillation. Dried down to complete desiccation, it burnt the same as the specimen in Obs. XI.

OBS. XIII. *Deflagration of Spinal Cord*.—A portion of spinal cord divested of extraneous membrane and fat, and measuring six inches in length, was held across the flame of a Bunsen burner. It did not take fire, but immediately gave out a series of faint detonations, and then charred without bursting into flame.

From these observations relating to combustion of brain matter in air the conclusion may be drawn that nervous matter begins to ignite and consume when it has lost half its weight of water. After losing more water its combustibility and dispersion of energy by heat is very great, and when it has lost all its water it burns actively with slight explosive phenomena and with a completeness that leaves about 2.50 per cent. of pure carbon.

OBS. XIV. *Action of Solution of Hydrogen Peroxide on Brain Pulp*.—Eight ounces of freshly prepared brain pulp were thoroughly mixed in a glass basin with two ounces of a 20-volume solution of hydrogen peroxide, neutral to test paper. The solutions mingled freely, and the brain matter was soon bleached into a snowy whiteness, the whole resembling cream in consistency. After a period of ten minutes bubbles of gas had formed freely on the surface; they remained lying as vesicles about the sixth of an inch in diameter, and when discharged by being pricked they left a cavity in the brain pulp which filled up very slowly. In the course of four hours' exposure at 100° Fahr., all the upper part of the pulp charged with the peroxide was raised like fermenting dough, and then subsided into a uniform whitish creamy fluid containing little bubbles of gas, showing the pressure in the brain matter of a substance

or ferment which displaces oxygen from the peroxide of hydrogen combination.

OBS. XV. *Desiccation and Combustion of Oxidised Brain Pulp*.—A specimen of 100 grs. of the oxidised brain pulp was desiccated as in the previous experiment until it ceased to lose weight. The mass, a very pure white concretion, weighed 19 grs. Placed in a platinum crucible, the mass burned with the same brilliancy as in previous observations, but with a whiter light and with fewer scintillations. The residue of the 100 grs. was 2.20 grs. of carbon.

OBS. XVI. *Separation of Oxidised Brain Pulp in Water*.—A glass basin was filled with water and particles of the oxidised brain pulp were taken up by a pipette and dropped drop by drop on the surface of the water. As each drop fell on the water it sank slightly, then rose again to the surface and floated like a small disc of cork on the water. These discs seemed to have no adhesive power for each other, and when they came nearest together were found by the magnifying glass to be separated by a fine film of water. They floated about with great mobility, were attracted to the sides of the basin, and were often drawn, from little irregularities of position, into masses, each one still remaining quite separate. This separation existed whether the drops, as we may call them, were as large as split peas or the size of small shot, the peculiarity being that they did not run into each other like globules of mercury, but when small enough produced a surface that looked uniform, although made up of so many distinctive parts. By brisk agitation they could be made to amalgamate in the water in what seemed to be a solution of them, but when this solution was looked at with a higher power minute division was still

traceable, looking like finely divided cellular structure. With escape of all the oxygen, re-coalescence of the separated particles took place.

OBS. XVII. *Combustion of Brain Matter in Oxygen.*—Fresh brain matter which had been dried through various degrees in the usual manner was tested as to combustion in oxygen gas. Portions that were completely desiccated, lighted, and plunged into pure oxygen gas, burnt as a taper would, with extreme brilliancy without yielding any smoke. The scintillations were also most brilliant, but they and the flame were not sustained for so long a time as when the combustion took place in air. The yield of carbon residue was in the same proportion as when the combustion was carried out in common air. Another portion of brain matter, which had lost half its water, burnt brilliantly in pure oxygen with scintillations, but, as in air, less brilliantly than in specimens from which more water was removed. A third specimen, from which 44 per cent. only of water was removed, burnt with a less brilliant flame, but continued to burn to the end as though, in burning, it desiccated. It did not go out at intervals as a similar specimen did when burning in the air.

OBS. XVIII. *Deflagration of Brain Stuff with Potassium Nitrate.*—A specimen of 100 grs. of fresh brain pulp was intimately mixed with 10 grs. of potassium nitrate, and was placed in the drying oven at 115° as usual. Exposed for three days, this specimen dried down to 33 grs., which deducting the 10 grs. of potassium nitrate, gave, as in previous instances, 23 grs. of dried brain substance. The dried matter of brain and potassium salt was brittle and easily crumbled. It was combustible without being explosive, and without giving scintillations. It burnt precisely like touch

paper, yielding smoke, and it seemed to consume without leaving any residue.

OBS. XIX. *Combustion of Brain Pulp with Potassium Chloride.*—A specimen of 100 grs. of brain pulp was intimately mixed with 10 grs. of potassium chloride. It was then placed in the drying oven and allowed to dry for three days, when it was reduced to 32 grs., which, deducting the 10 grs. of potassium chloride, represented 22 grs. of brain. This specimen was also brittle, but it burned very indifferently, without scintillations, and not without being frequently re-lighted at the lamp flame.

OBS. XX. *Combustion of Brain Pulp with Amyl Nitrite.*—A specimen of 100 grs. of brain pulp was intimately mixed with 10 grs. of amyl nitrite, and was subjected to the oven at 115° , as in previous experiments. After three days the specimen had dried down to 23 grs., the whole of the amyl seeming to have been dissipated. The substance underwent combustion precisely in the same manner as dried brain pulp to which no addition has been made.

OBS. XXI. *Combustion of Brain Pulp with Nitric Acid.*—Three specimens of brain pulp of 100 grs. each were treated separately in three small glass cups, with solutions of nitric acid at different strengths. To one (A) was added 100 grs. of a watery solution containing 10 per cent. of the acid. To the second specimen (B) 200 grs. of the same solution were added; and to the third specimen (C) 400 grs. All the specimens were then placed over sulphuric acid in the drying oven at 115° , and were left for five days, at the end of which time specimens A and B weighed 27 grs., and specimen C 28 grs. The colour in all was changed to a light golden colour, most marked in specimen C. They

were all broken up somewhat into little parts, specimen C looking almost like a crystalline surface, and yielding crystals when examined microscopically. Each specimen underwent combustion in flame, but very indifferently when compared with brain stuff simply dried down to the same point; each caught alight within the flame and burnt well, but so soon as it was removed it went out slowly, and every specimen left behind it a rather large, pitchy residue after combustion.

Small portions of each of these specimens were placed on an anvil, and struck forcibly with a hammer to see if any detonation would occur. Detonation did not occur, but it was observed that the blows of the hammer beat out the specimen into a soft plaque which adhered firmly to the metal, and which, immersed in a flame, burnt slowly away on the metal. It was also observed that the rapidity with which these specimens absorbed water was remarkable, specimen C being deliquescent in its character.

FOUNTAINS OF MEDICAL SCIENCE AND ART.

"The past deserves that men should stand for a time upon it to view around which is the best way; but when the discovery is well made they should stand no longer, but proceed with cheerfulness."—SIR FRANCIS BACON.

EARLY STEPS TOWARDS OVARIOTOMY.

IR SPENCER WELLS, in his work on the diseases of the ovaries, pp. 290-303, in 1872, has treated well on the origin of ovariectomy, but has not introduced the name of an observer who has hitherto been forgotten; I mean Mr. Power, a surgeon who practised at Bosworth in Leicestershire, and who gave the very best reasons, of an original kind, for the performance of the operation. Power communicated his ideas to Erasmus Darwin, after the examination of the body of an elderly lady, who died of ovarian disease on March 29th, 1793. In this communication he says :—

“On opening the abdomen I found a large cyst attached to the left ovary by an elastic neck, as thick as the little finger, and so callous as not to admit of being separated by scissors without considerable difficulty. The substance of the cyst had an appearance much resembling the gravid uterus near the full period of gestation, and was as thick. It had no attachment to the peritoneum, or any of the viscera, except by the hard callous neck I have mentioned, so that the blood must with difficulty have been circulated through it for some time. Its texture was extremely tender, being

easily perforated with the finger, was of a livid red colour, and evidently in a sphacelated state. It contained about two gallons of a fluid of the colour of port wine, without any greater tenacity. It has fallen to my lot to have opened two other patients, whose deaths were occasioned by encysted dropsy of the ovarium. In one of these the ovarium was much enlarged with eight or ten cysts on its surface, but there was no adhesion formed by any of the cysts to any other part; nor had the ovarium formed any adhesion with the peritoneum, though in a very diseased state. In the other the disease was more simple, being only one cyst, without any attachment but to the ovarium.

“As the ovarium is a part not necessary, and dropsies of this kind are so generally fatal in the end, I think I shall be induced, notwithstanding the hazard attending wounds which penetrate the cavity of the abdomen, to propose the extirpation of the diseased part in the first case which occurs to me in which I can with precision say that the ovarium is the seat of the disease, and the patient in other respects tolerably healthy; as the cavity of the abdomen is often opened in other cases without bad consequences.”

In this communication Darwin adds (*Zoonomia*, Vol. III., pp. 270-72, in 1801):—

“An argument, which might further countenance the operation thus proposed by Mr. Power, might be taken from the disease frequently affecting young persons; from its being generally in these subjects local and primary, and not, like the ascites, produced or accompanied with other diseased viscera; and lastly, as it is performed in adult quadrupeds, as old sows, with safety, though by awkward operators.”

COTEMPORARY PRACTICE AND LITERATURE.

"Every physician will and ought to make observations from his own experience ; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."—FREIND.

CONGRESSIONAL MEDICINE.

THE Medical Congress at Rome, held in May last, was, previous to its advent, a theme of universal acceptance and great expectation.

For medical men to hold a grand, scientific meeting in the heart of History, where Celsus wrote, Virgil sang, and probably both practised the healing art, and knew it if they did not practise it, was something indeed to wonder about. To see Rome ; to visit haunts which from childhood every one had read and heard of, was something to wonder about. It was the old world of life, like a magnet drawing the new world of life unto itself. Then there was the hope of meeting faces hitherto unknown, belonging to names well known. And, finally, there was the passing possibility of an introduction of something new in medical science and art ; no inauguration, but some probable improvement of real value and onward advancement, with at least a pleasant journey. The whole was a dream of anticipation that now has passed and gone. From all accounts it was a restless dream, breaking repose and bringing little refreshment. One visitor, well equipped and optimistical enough, told me on his return : " My

limbs were aweared with journeying, my eyes with seeing, my heart with emotional sentiment lighted up afresh; my spirit with constant bewilderment and disappointment; my digestion with irregularities; and my brain with confusion." This probably was an excessive criticism, but with lesser and stronger expression it has been very general, more than one of the visitors explaining that he saw Rome but not the Congress, finding it better to court the first and avoid the second, or having no other alternative,—Hobson's choice.

Such an idea of the Congress, conveyed second-hand, and derived from listening and reading, may, however, be incorrect, and some service to scientific and practical medicine must have accrued, although, from the reports, that advantage was small, a fact of remarkable meaning when connected with a meeting at which medicine gathered in its thousands, professedly to read, mark, learn, and teach the progress of its science and its art. But when we begin to reflect on the matter there is nothing remarkable in the result. Congresses are successful, when from a few learned to a host of unlearned persons, they conveniently diffuse, from the few, a large amount of special knowledge to the many with all the living force of the living masters who are present to teach and demonstrate; also, when they afford the means of distributing hospitality and pleasure, leaving behind them memories of a lasting and agreeable character; lastly, when they enable persons who might not otherwise have the opportunity, to see in the flesh men who are celebrated, and whose names may make history. On these lines Congresses play an interesting if not an essential part in our generation, and there what they do ends. It is

different when a Congress of men of one profession is brought together, each member of it theoretically, and not far from practically, equal, for then the greater objects are blotted out, and even the lesser are considerably blurred in a confusion of tongues—which from the first is injurious to success—in rivalries which are unavoidable, and in doubtings and oppositions which strike, but neither destroy the false nor defend the true. That great special Congresses will die out no one can doubt. Those who organise them look for glory, forgetting—

“That glory is like a circle on the water
Which never ceaseth to enlarge itself,
Till by broad spreading it is brought to nought;”

And they will die out because they are dead set against individuality. They run at present with socialistic tendencies, in tune with a time that enables any industrious mediocrity to get a prominent place in the crowd, leaving the true workers alone in their work-shops and studies, or preventing those who would fain be true workers from daring to do anything except join the popular throng. This state of things cannot be triumphant. The isolations, few though they may be, build up medical science. In twenty centuries of physic there have not been twenty real foundation layers,—men who have in the strict sense inaugurated discovery, and amongst these each has been in the strictest degree an individualist. In no profession has individualism been so completely the heart and soul of scientific work as in ours; and when the history of professional discovery is unrolled and displayed to students of the coming century, the wide-spreading circles will, as surely as the circles on the water have been brought to nought.

"THE MEANING AND METHOD OF LIFE."

BOOK of 291 pages bearing the above title, with the addition of the term, "A Search for Religion in Biology," has been received from Dr. George Gould (G. P. Putnam's Sons). The work opens up an entirely new field in the study of the phenomena of life. There can scarcely be any reader of a philosophical turn of mind who, having commenced the perusal of the book, will not, as a student, continue to read page by page until he has reached the end. For my part, I do not specially sympathise with the introduction of the author; but this fact rather indicates a difference of constitutional tendency between us than a difference of opinion. Touching on the question of the starlit Heaven above, and the moral Law within, Dr. Gould tells us that until he reached the truths he is endeavouring to illustrate, he felt that utter desolation of despair called "cosmic horror;" that "volcanic shuddering and sickening of the soul at the contemplation of the awful infinity of the dead, cold, and purposeless universe without, with an unknown God within, which, by an unknown instinct, is commanded by an unknown self to do an unknown duty." "He has also," he says, "learned that many another sensitive, despairing soul, in the face of glib creeds and loneliness of subjectivity, has also and often felt the very heart of life stifled and stilled with an infinite fear and sense of lostness." "Now," he continues, "he can look into the starry depths of space without a shudder, for knowledge lends comfort even to fate, and the certainty of vision and the love of God in the world about and within him translate the stern command of duty into a sweet and irresistible invitation of

the Father to help the Father.” This form of sensation, I daresay, affects many more than Dr. Gould, but I could not myself express truthfully that it has in any way influenced me in any term of my life. I have ever been content to receive like a child phenomena just as they are, endeavouring to enquire into their nature without any feeling of “cosmic horror”; and there are many like me in this respect. Perchance, indeed, the argument of Dr. Gould fails to hold many; and yet we all might be fascinated by his book, and feel sure it is one that is likely to create a profound influence on the world of thought. The book and its argument remind me much of some portions of Aristotle, especially the passages by him that relate to the parts of animals. Readers will remember that Aristotle, in dealing with the construction of various natural instruments and parts, suggests that the secondary god, or gods, by whom the whole was contrived, either had an imperfect art, or had not time to carry out all that ought to have been done, or had not sufficient material ready for the design. The ancient philosopher in this sense conveyed, if he did not explicitly state, his belief, that in boundless nature there is a creative cause which has employed secondary agencies for carrying out details in the scheme of the universe. Dr. Gould appears to recast that idea. To his mind, inanimate or inorganic matter existing in the solid earth, in planets, in satellites, in suns, is a grand although lifeless mechanism, having no law except in the force of gravitation. “In all the world there are finally but two objects, the physical and the extra physical, or, in common language, matter and life. Perception, through the senses with scientific imagination and inference, gives us knowledge of the physical world; self-

consciousness gives us knowledge of the metaphysical world, supplemented by the observation of the result of Life's activity in the material realm." Thus, according to him, the inference is that the pure physical construction of the universe is one act and action, varied in infinite ways, but having really nothing to do with Life. There may be a planet, a satellite, a sun, all in full physical action, yet it may not be in a condition for the existence of Life. Even our own earth is not everywhere in that condition. But there is a time when, the conditions being favourable for it, Life—"Biologus," as he calls it; in plain language, a God striving against difficulties of a common nature, which, in fact, still in plain language, is our own selves, appears, things being ripe for the advent, and almost inevitably disappears when the conditions by which it was maintained are withdrawn. So there are live planets and dead planets; and even on a live planet, like our own, for instance, a very small portion is dedicated to Life. "Thus, the God we see daily at work all over the globe in organic forms is primarily and essentially LIFE;" and this word alone for the ordinary uses of our writing and speech "is sufficient, full, and rich, to satisfy the sympathetic mind."

The theory advanced places us, the life Gods, in the same position as the power that moves us itself, a power not infinite, but finite. The infinite lies beyond us. It is impossible that matter should have been created *de novo*, and it is equally impossible that even divine power could annihilate a single atom. "Matter and its properties, all purely mechanical and unchangeable, we must accept as eternal and existent. But when we turn to a consideration of our metaphysical reality, and that of Him who is the Father of us, we

find no warrant of science or of immediate perception to justify us in a restful certainty of conviction of his eternity or self-sufficiency. The faultless continuance and infinite variety of every renascent incarnation, every blade of grass and living thing being his avatar, is a faultless proof of process and unattained result; evidence of finiteness and incompleteness of one who himself may be a divine victim of some struggle for existence."

I have mapped out in the above sentences the particular ideal which Dr. Gould puts forward in the commencement of his work. He follows it up with chapters on incarnation, cytology, sensation, evolution, reproduction, justification of the incarnation process, freedom, personal immortality, ethics, beauty, sleep, dreaming, and awakening, topics which in review, would take away much pleasure, arising from the perusal of a strange work, from those who wish to see how an able and industrious mind can deal with a most absorbing subject without creating one angry impression or suggesting one phase that, by the so-called reverent, can be considered subversive of reverence. For beyond all speculations as to secondary causes there is still admitted the spirit, the eternal energy, the great first cause which simple men call God, "from whom, as Plato divinely says, we all came, and to whom we must all return."

QUAIN'S "DICTIONARY OF MEDICINE."

HE new edition of Quain's *Dictionary*, revised and enlarged, appears in two volumes, from the house of Messrs. Longmans. The editor-in-chief, Sir Richard Quain, is this time assisted by Dr. Frederick Thomas Roberts and Dr. J. Mitchell Bruce, together with a staff of two hundred

and twelve contributors, fifty of whom are new in the present edition. The volumes are of interest, apart from their practical value, by indicating in as full a degree, perhaps, as is possible, the science and the art of medicine, in the degree such science and art are represented in England in this closing part of the nineteenth century. The book is essentially English in fact as well as in name, and in future years will, no doubt, be compared and contrasted with other similar books which this nineteenth century has produced. It will be compared with the old cyclopædia of medicine, it will be compared with Mason Good's *Practice of Medicine*, and specially will it be compared with Copland's *Medical Dictionary*. It will show by these comparisons and contrasts how the old classical style of physic has died out, how little we care in this day about origins in learning, and how, in fact, we have come to depend upon knowledge gleaned by writers apart from books. Unfortunately, it will not convey the fact that in leaving written books allegiance has been transferred from them exclusively to the book of nature ; for this is more, perhaps, than could be expected ; but some attempt is made towards this position, with, as might be expected, varying success. As to modes of exposition, and of style, they are some two hundred and twelve times varied, causing, like boiling-point, a good deal of commotion, and preventing monotony—results which may possibly be an advantage, since the volume is not intended for continuous reading, but for frequent reference, with sufficient intervals to prevent one article mixing up with another in the mind of the reader. Sufficient for the article is the special value thereof ; and the value intended is that the student or practitioner can, by a turn in the alphabetical

mechanism, drop on the latest information of a truly orthodox kind—for there is not a sentence of heretical originality from A to Z—relating to any particular disease and its treatment, or to any other medical information he may require, without a moment's delay. In the whole history of medicine there surely was never a compendium so ready in these regards, a compendium as akin to the age as railway locomotion or telegraphic communication; an imitation, in fact the familiar, of both.

No living critic would dare to make a comparison of one article with another in these volumes. He would be torn to pieces if he did; for as the work is that of living professors or nearly so, and as comparisons are more odious than ever in these degenerate days, the vigorous authors must, alas! wait until they are dead before they get their awards, if so be that by that time they have left, in their rapidly changing era, a rack behind to be awarded upon.

The essential value of the *Dictionary*—and the value is great—is that it reflects, in all its varied lustres, the English Medical Physic of 1894; and as we know not what we are, or what we do, some of the lustres may continue to shine for all their day, which means until another new edition, “revised throughout and enlarged,” usurps their place, and yields another grand transformation. The volumes are splendidly got up, and do the utmost credit to the enterprising and eminent publishers, who have spared no expense and no trouble to frame and familiarise the face of physic of the passing time for the medical fraternity, as well as for students of that encroaching public who, in case of need, before they for a doctor run, would run and read.

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1st
 Quarter,



1894-5.



ON URÆMIC AND DROPSICAL COMA.*

ON the same day in the wards of the Temperance Hospital I had under my care two cases of uræmic coma, in each of which I drew blood from a vein in the arm. They were typical cases, and in a state so near the moribund that what is now considered an extreme measure of treatment was fully warranted. The treatment in one instance was remarkably successful, and the effect of it followed so distinctly, I can venture without offence even to a medical mind as sceptical as my own to apply the word *cure*. In the other instance death took place, but not without some previous indications of a rallying which would not have been expected if the patient had not been bled, and which indicated that the remedial measure, although not successful, had been in the right direction and had brought a certain degree of promise, which was in its way of a satisfactory nature. The first of these patients was a young woman who had

* As a matter of passing interest, it may be well to intimate that, through the kindness of Messrs. Hazell, Watson, & Viney, I was able to dictate this paper into their phonograph in London. It took me rather more time to speak it than it does to read it straight off aloud from print; but the rapidity with which the thing was done was surprising, and the extraordinary correctness with which the able compositor set up the type from the wax echo of the dictation was most satisfactory.—B. W. R.

suffered from albuminuria for some months, and in whom the ophthalmoscope showed that she suffered also from albuminuric retinitis, for which in fact she came to the hospital to be under the care of my colleague, Dr. Collins, the surgeon to the hospital. The second patient was a middle-aged man who had suffered from chronic nephritis, passed large quantities of albumen, and was œdematous in the lower half of the body, with some ascites.

The two patients became comatose almost at the same hour. Venesection in the young female patient was easily carried out to the extent of sixteen ounces of blood. The venesection was attended with instant relief, the convulsive movements ceased, and the kidneys began to act freely; consciousness also returned, and she afterwards slept during the night without oppression, starting, or convulsion. At my visit next day she was quite conscious, but she explained to me that she had no knowledge of my previous visit nor of the fact that she had been bled. She made a rapid and good recovery. In the chronic case the same good results did not follow the operation of bleeding. The veins, naturally very small, filled imperfectly, and the blood, dark and viscid, flowed slowly in a thin stream, yielding from eleven to twelve ounces. The abstraction seemed to give relief to the convulsive movements and a return to semi-consciousness. Some hours later the coma again became pronounced, with coldness of the limbs and trunk and painless death. In this patient, recovery of an ultimate character could not have been expected, but some relief was rendered and perhaps a little extension of life.

A third case of a most interesting kind was for several months under my care in the hospital. The patient

was a man sixty-two years of age, suffering from hydrothorax with a development afterwards of ascites, followed by cedema of the lower extremities. In him albumen appeared in the urine intermittently with frequent attacks of a comatose kind, which lasted several hours, the urine being always scanty in quantity. He remained under my care from July 1892 to May 1893, the peculiarity of his case being the extreme effusion which took place in the thorax, peritoneum, and lower limbs. Almost immediate relief was given to him in the first instance by tapping the thorax, from which, at intervals of some weeks apart, six hundred and thirty-two ounces were drawn, in eight tapplings. As the abdomen filled and refilled it was tapped, fifteen times, and from it three thousand and eighty-nine ounces of fluid were drawn off. From the cedematous limbs two hundred and seventy-two ounces of fluid were abstracted by means of Southey's tubes. In the whole no less than twenty-four gallons, three pints, and thirteen ounces of fluid were removed from this man. By each of these operations he was relieved, and the comatose symptoms were always relieved. He left us *in statu quo*, and was removed to some home or charitable institution, where I have heard since that he died.

I have selected these cases as three extremely typical in their way. The first may be accepted as a case of subacute uræmia, occurring in a young person and following some lesion which led to change in the kidney and to increase of urea in the blood. All the symptoms point to these conditions, and I would especially observe that it is precisely to this kind of case we may expect good to arise from prompt and free venesection. The second is an instance of a more

chronic kind, in which, in addition to the increase of albumen in the urine, and probable increase of urea in the blood, there was some effusion, not sufficient to create general anasarca or, as it may be called, dropsy of the tissues, but sufficient to mark a distinct form of uræmic poison. The third is a most remarkable illustration of a comatose state due not actually to urea, but to partial suppression of the function of the kidney, and to accumulation of fluid in the tissues and cavities of the body. It may be said indeed of this man, that the cavities and tissues of his body became, as it were, for a time, like a bladder widely extended. That is to say, the parts in which the serous fluid accumulated acted in the same way as the bladder does; they held for a time fluid which ought to have passed from the body, but they, being altogether larger, allowed the fluid to accumulate in the great proportions of which I have spoken. We were accustomed to say of this man that we could let him die at any time, simply by refusing to extract the fluid which had been excreted into the different cavities. I doubt not that in the end this was the actual cause of death.

The most interesting facts connected with these cases are the differences in the comatose symptoms caused by the three various circumstances under which they arose. The coma was marked in all cases; it was most marked in that which succumbed after the venesection; but it was present in so marked a degree in the first case, that the patient could not be aroused. In the third case, that of the man from whom so much fluid was taken from the body, the coma occurred at intervals, sometimes deep, and attended with startings, but no convulsions. He would wake up cheerfully after a long sleep, and remain awake sometimes for two or three

consecutive hours ; but the inclination was at all times towards sleep, and he often slept apparently without knowing the fact himself. A peculiar symptom attended the sleep of this man, that, namely, of grinding his teeth so loudly that he sometimes kept every other patient in the ward awake by the noise that was produced, he being unconscious that he had done anything that would disturb even the patient in the next bed. For this reason we had occasionally to shift him in such a manner as to place him by himself, and restore silence in the ward.

THE CAUSE OF THE COMA.

What is the cause of coma in these cases? That is a point to which I particularly wish to direct attention. The views which have been held in regard to coma in uræmia have been two in character ; one, that the coma is the direct action of urea circulating in the blood ; the other, that the urea circulating in the blood is decomposed, and, as Frerichs first suggested, is transformed into carbonate of ammonia. In 1861 I made a long series of researches on this matter, and the conclusion I came to was that the theory of Frerichs, much as I admired his great ability, of the urea being decomposed into carbonate of ammonia, and the carbonate of ammonia being the cause of the symptoms, was not clearly demonstrated. I discovered that carbonate of ammonia, although it may be poisonous to the body, produces symptoms dissimilar to those which are present in uræmic coma. Frerichs assumed that in uræmic coma ammonia can always be detected in the breath. In this respect he was partly right. I found sometimes that ammonia was distinctly evolved by the breath, owing, doubtless, to an excess

of ammonia in the blood; but in other instances of uræmia no such phenomenon was observable; indeed, it was sometimes surprising to find entire freedom from ammonia in the breath-vapour. Dr. Hammond of Philadelphia took the same view as myself, and I think, practically, we may say that ammonia, as a narcotic poison, is not properly assignable as the cause of uræmia; if it were, the blood would be far more rapidly disorganised than it is, for although persons with uræmic symptoms sometimes go on for many hours with changes in the blood which are of themselves distinct, they are not such changes as arise from the direct action of ammonia itself—solution of the red blood corpuscles and extreme fluidity. The action of urea as a poison seems to me to indicate the most distinct kind of poisoning in cases similar to the two first which I have noticed. It is also worthy of observation from my experiments, that urea largely diluted acts as effectively as when it is more condensed, so that we may assume that the presence of urea, as urea, in the blood is really and truly the cause of the coma. I found by experiment that in the lower animals coma could be produced by urea itself in the most distinctive manner, together with the convulsive movements which commonly attend it.

But the point to which I wish to direct attention most particularly in this paper is the effect of water in the production of comatose symptoms in the body. In the last case to which I referred, where the patient lived for so many months, it was always said of him that he was suffering from uræmic symptoms. It was a point whether that was the case; if it had been, if there had been an excess of urea in his body at the time, I do not think it possible he could have lived for so long

a period; it must have been, as a matter of course, that a certain amount of urea was secreted, but was distributed so widely over the tissues, and was so much diluted, it was not the direct cause of death, as in uræmia proper. It was to some extent an aid to the cause of death, but the universal dropsy, relievable by the process of drawing off the fluid that had been excreted into the cavities, was the chief cause. The symptoms which this man presented resembled, in fact, very closely those which are producible by the introduction of water in large quantities into the bodies of inferior animals. I found by experiment, that an amount of water equal to a fifth part of the weight of an animal could be introduced into the body without development of pain, or any symptom of a fatal character; but if over one-fifth of the weight of the body of an animal were introduced, fatal results would follow, and when such results did appear, they were always in the character of coma. An animal charged with water to this extent, one-fifth part of its own weight, would wake up at intervals just as our patient did, walk as he did with a drowsy tottering gait, but soon lie down again and sleep on. The continuance of life, if the complete surcharge of water was maintained in the body, was usually about twelve hours, the death occurring as in the most painless and gentle sleep. If the amount of water injected were less in weight than a fifth of the body of the animal, the symptoms were identical in character with those that have been described in the dropsical patient, and it is worthy of notice, too, that the urine under those circumstances carried, intermittently, albumen in its course. The effect that was produced upon the body was the effect of debility induced by the dilution of

the blood and the feebleness of muscle incident to the diffusion. To this also must be added the effect which these surcharges of fluid had upon the brain. The brain cavity was always surcharged with fluid, and upon the pressure that arose from this surcharge depended, I think, undoubtedly, the coma which was produced. When water is introduced into the blood in excess, the effect of it is, that it causes effusion of a direct kind into the cerebro-spinal cavity, and then occurs that change, (described in the first number of *THE ASCLEPIAD*,) brought about through the simple pressure of the cerebro-spinal fluid. The pressure of the cerebro-spinal fluid produces coma, very distinct in character, but when the pressure is taken off from the body at large, the brain is relieved, and consciousness returns.

PRACTICAL SUMMARY.

The practical points most deserving of notice from these observations, whether the theory advanced be accepted or not, are briefly as follows:—

In disease of the kidney leading to suppression of urine there are three classes of cases. (1) Cases in which there is acute uræmic coma occurring suddenly without dropsical exudation, in which the coma is deep, the breathing stertorous, the muscles restless or convulsed, and the eyeballs moving from side to side or upwards and downwards, or obliquely; symptoms the same as those which can be synthetically induced by the introduction of urea into a healthy organism. (2) Cases in which coma appears with dropsical symptoms, œdema, ascites, or pleuritic effusion. (3) Cases in which, with universal dropsy, there are comatose conditions not amounting to deep coma, but in which the drawing off of fluid from

the cavities of the chest or abdomen, or from the cellular tissue, relieves by its escape, with removal of coma, and, for a time, a new lease to life.

The first of these classes depends, it may be fairly assumed, on diffusion of urea, in a comparatively concentrate form, through the system, so that the true toxic action of the salt is acutely developed. The second seems to depend on free diffusion of urea through the system, but with a considerable amount of watery fluid, serum. The third appears to be a widely-spread dropsy, in which urea, if it be accumulated at all, is so extremely attenuated with water that its toxic effects are not manifested, but the pressure produced by the effused serum tells upon the central nervous system and gives rise to the semi-comatose condition. Where these symptoms are prolonged, cases are commonly registered as those of chronic dropsy.

THE MATTER OF TREATMENT.

In respect to the treatment of these three kinds of coma, the lines are very clear.

In the acute cases, such as the first described in this communication, there can be no doubt as to the value of blood-letting from a vein. The opening of a tap or plug in the lower part of an overflowing water cistern is not more decisive in balancing the overflow than the removal of blood in uræmia. It is a practice which, when the diagnosis is clear, ought never to be omitted. Even a feeble pulse ought not to prohibit it. Judiciously applied, it is free from danger; it does not lead to collapse or shock, and relief from the symptoms that have preceded is, as a rule, immediate.

In the second class of case, where there is dropsical exudation with deep coma, bleeding is still a sound and

correct remedial measure, although never very hopeful. It seems to give relief but not more. The reason of this is, I think, obvious, namely, that the re-absorption of fluid collected in the cavities is so rapid, the blood circuit rapidly refills with fluid; thereupon there is increased flow into the circulation, new diffusion of urea, and return of pressure on the brain. If we could safely remove all the effused fluid immediately before or immediately after the abstraction of blood there might be some chance of success, but to such a course, at best temporary for good, there are practical objections, the chances of syncope or collapse for instance, which possibly outweigh the consideration of the line of treatment that here suggests itself. Suffice it to say that, although I have drawn blood under the conditions now being considered on at least six occasions, and have never observed bad consequences as a result of the operation, but always some degree of temporary relief, I have not seen actual recovery as a result.

In the third class of case, case in which there is extensive exudation with partial coma, or, more correctly speaking, with comatose tendency owing to fluid pressure, bleeding need not be contended for. It could do no real service, not more than it could in ovarian dropsy, while it would be attended with some danger. But the method of treatment by artificial removal of fluid, tapping, is here of the greatest service. All attempts to remove the fluid by what are called diuretics have been in my hands capricious and doubtful as positive means. In the third example of disease specially noticed, I believe there was no omission of any medicinal diuretics worthy of consideration, yet the best that can be said is that now and then there was

for a day or two an increase in the quantity of urine. Diuretin in fifteen-grain doses three times a day increased the flow of urine once to one hundred and seventeen ounces in the twenty-four hours; but the medicine had to be stopped owing to its production of a rapid and feeble pulse with marked prostration. The operation of drawing off large quantities of fluid from the abdomen, however, gave relief to the kidneys so much on one occasion that the second day after the operation the quantity, which had been twenty-one fluid ounces the day of operation, rose to thirty-eight for two days afterwards.

It appeared that the removal of fluid was, on the whole, the best remedy; removal, by aspiration from the thorax, by the trocar from the abdomen, and by Southey's tubes from the lower limbs, proved the most appropriate means. During all the time the patient fed well, and the comatose tendency was always relieved by reduction of pressure.

TEMPERATURE OF THE BODY DURING DROPSICAL COMA.

The principal object in this communication has been to indicate three forms or degrees of coma, with the treatment that was best adapted to each form. But there is one other observation of considerable moment, bearing on such cases, relating to the temperature of the body during comatose states. It is usual in acute uræmic coma (example 1, in the three cases quoted) for the temperature to be more or less above the normal. It is not common for the temperature to rise very high, but it rises one or two degrees above the natural, until *articulo mortis*. During what may be designated dropsical uræmic coma, the tendency (example 2) is

for the temperature to be a little below the natural, never above it, unless there be some inflammatory complication. During dropsical coma (example 3), the temperature is usually below the normal. Thus the temperature in this example, taken on 305 separate days, was only 40 times over the normal, and then was not above 100° Fahr., for a short interval; whilst the average readings under the normal were 97° Fahr. When the temperature rose, it was after the relief given by the artificial removal of water by paracentesis. After diuretin, when that remedy seemed to act freely, the temperature fell below the normal.

Reflecting on all these points, they convey to my mind the idea that in deciding on treatment in these various forms of coma, temperature should play a part in the determination. If the temperature be above the normal, I do not think, *cæteris paribus*, there is need for a moment's hesitation about the performance of venesection; if the temperature be normal, although some dropsy be present, there need be little hesitation about bleeding; but if the temperature be below the normal with dropsy, then venesection could not be expected to render the least service, might indeed be a dangerous process by inducing a superfluous flow of water into a blood already attenuated. The point of practice in such a case is to draw off the effused fluid upon the pressure from which the coma is dependent.

HEALTH AND ATHLETICS.*



STUDENT all my life, and still a student, I have the greatest pleasure, fellow students, in appearing before you to deliver, at your request—made through Mr. Francis Thomas—a Lecture on “Health and Athletics.”

I understand that you have been led to wish for this lecture from reading my address on the Athletic Life, lately delivered before the Birmingham Athletic Society, and published in *Longmans' Magazine*. It will be fitting therefore that this lecture should be a kind of expansion of that essay, and that I should endeavour in a plain and simple way—as a student speaking to students—to deal with athletics in relation to health. I have always been a staunch advocate of exercises of a physical kind, my experience—I mean personal experience—having been from the earliest part of my life strongly in their favour. It is possible that some would say I had thrown away working time on physical exercises, and it is true I have given up many hours that might have been devoted to books, on physical labours of a healthful and more recreative description ; but I do not believe that I have ever, in the true sense, lost anything,

* Lecture delivered before the Shaftesbury Club, Oxford, in the Clarendon Room, March 3rd, 1894.

because it has always seemed to me that by working with much more ease after good exercise, I readily made up the time that seemed to have been lost. More than that, I was not so sensible of fatigue from mental work after exercise as when I kept to the desk or the book more closely, and it is quite certain that the general health and nutrition of the body have been improved by the physical activity pursued. I am sure, therefore, I am not misleading any student in recommending him to combine good physical work with mental work.

I am sorry I have not a large number of facts of a direct physical kind at hand bearing upon various sports and exercises. My own exercises have been confined chiefly to walking, riding on horseback, bowls, cricket, and cycling, with an occasional touch of rowing, but not much of the last, and never in a systematic manner. At the same time, from great interest naturally felt in sports, and from a rather long life, I have come as largely into contact with athletes of various kinds as most men, and have indirectly learned a large number of practical truths. It is well I should tell you this, because you would not think much of a man who came down as a mere bookworm to talk to you about athletics and athleticism.

In the paper on the Athletic Life, the nature of that life as a special one is defined, and I do not care to vary the definition. The athletic life is in the main physical, and it is what its name implies, a physical contest. The term "an athlete" means a person who can boast of physical powers; one who can wrestle, run, walk, swim, cycle, ride, fight—with or without weapons—play at active games, and, in a word, use his physical powers, not against ordinary men, but against

men who claim similar athletic qualities. It seems to me that this life is a short one, running only from about 18 to 36 years of age, 18 years in all, the fifth part of one of the longest lives. But there is another kind of life which, though not strictly athletic, borders upon it. Every man is not born an athlete, but there are large numbers of men, and I may add, women too, who, though they may not enter into competitions of a severe kind, are nevertheless capable of doing a great deal of first-class work. We may call these minor, or sub-athletes, and they abound in every large school and every university and college in the world. They in their way, therefore, come under similar rules to those laid down for athletes, and it is not necessary to alter the title of this lecture in order to include them within its teaching. My argument is that for all classes the physical school is a grand training school, and that it is good, even for those who are removed from actual athletic competition.

Before we pass to the special consideration of athletic exercises, it may be as well to direct attention in a general way to the advantages and disadvantages of them, for there are disadvantages as well as advantages connected with them.

THE ADVANTAGES.

The advantages of physical exercises consist in the cultivation of mental as well as physical skill. The physical body is better developed if exercises be properly carried out and be of the best kind. By them the form of the body is made more perfect; the vital functions are carried out with greater regularity and vigour, and the senses are rendered more acute and better able to carry out their important duties. The sense of sight is

specially benefited by physical exercises ; the muscles which move the eyeball are made to play with greater precision, so that the sweep of the sight is more rapid and more exact than it would be if good training were omitted ; the eye also learns to see things near at hand and things far off with greater ease, owing to the accommodation that is given to adjustment of the lenses of the eye ; and, the power of sight is more steadily maintained. The sense of hearing is in like manner rendered more acute and perfect ; sounds high and low are more distinctly appreciated, and the perception of the direction of sound, which indolent people rarely recognise without a particular effort, becomes an easy practice. The muscles of the body also become more obedient the one to the other in their respective functions ; they develop well and gain strength in the development ; and, they act correctly in regard both to time and tune. The physician knows that in health co-ordination of muscles and of muscular movements, which exercise of all things brings forth best, is a sign of health. He sees mischief, on the other hand, marking error in the nervous system whenever there is a deficient coordination, sees in fact more or less of derangement, or it may be disease, of the nervous system. In persons who cannot be said to be actually ill, want of coordination is often a mark in itself of deficient physical development and exercise. They fail in the most ridiculous manner in the use of particular parts, just as the left hand—which from want of practice is often an indifferent hand—fails compared with the right. Under good physical training disadvantages of this kind speedily disappear, and one part becomes as able as another. I knew one of the sporting men of the old school in the early part of my life, who had a saying

which illustrates this point exceedingly well. He used to say, "I wouldn't give twopence for a fellow who cannot fight with his left hand as well as with the right, or for a cock that cannot use the spur with both legs." Lastly, muscles that are well trained have more power for continued work. They are not easily tired, and they are recruited after a shorter rest than are muscles that are allowed to lie fallow,—if I may so express myself. These are advantages purely of a physical character, and there are others of a mental nature which are equally valuable. The well trained man learns in a very short time to make up his mind as to what is best to be done on emergency. He discovers that to decide wrongly is better than not to decide at all, so that at last he becomes competent in an almost automatic manner to know at once what is the best thing to be done at any given time, and what is the most graceful and safest way to do that thing. There is not a single contest of physical skill in which decision is not called for at every stage, and decision demands at all times a wholesome mental training, based on correct foresight and sound principle. Decision is, in fact, quick reasoning in all struggles; it is tact in motion. Another good mental quality brought out by good training is that it leads to presence of mind. His physical movements and the direction of those movements demand all the attention of the athlete, so that external noises and interruptions shall not interfere with him or take away what is commonly called his presence of mind. He is deaf to external noises, and is acting for himself, abiding by his own judgment. Thus he is enabled often to perform acts and feats which other persons consider dangerous, and to outsiders appears destitute even of fear. "He is brave," say the out-

siders; and it is true, for bravery is a great help, while fear is a disastrously catching disorder. A distinguished athlete who used to perform the most remarkable feats of strength and risk, once told me, "No man in peril succeeds if he is in fear." He meant that fear increases danger and often generates it.

Good exercise combines mental with physical endurance, and those persons are most finely balanced in whom the mental as well as the physical powers are sustained together. There is strength of body and there is strength of will in the man well trained to physical exercises, and the will, to use a common expression, drives the mind. At one time I thought that perfect physical endurance is what is mainly required for successful physical action. I was wrong there. I would not contend that mental endurance can supply physical, that is not the case; but certain it is that the most splendid physical qualities are of little value unless they are backed up by mental ones which give the vital spur to successful effort. Combined they are all-powerful, and supply qualities of precision, decision, presence of mind, and endurance, which are among the most advantageous qualities any one can possess.

DISADVANTAGES.

So much for advantages. Now for disadvantages connected with athletic sports,—for there are disadvantages, which ought never to be overlooked, but which ought to be as far as possible avoided when it is known what they are. I will put them fully forward therefore. There is a disadvantage in this respect, that sometimes, owing to faults in the training or to the selection of exercises that are not fitted for the body, or to

injudicious efforts to excel, certain parts of the body are irregularly developed. We are aware of this irregular development by the circumstance that it may actually become visible to the eye. In the opera dancer, there may be undue development of the muscles of the leg; in the rowing man there may be undue development of the muscles of the arm; and in the cyclist there may be not only undue development of the lower limbs when the exercise is carried to an extravagant length, but, owing to the mode in which the body is bent over in the act of cycling, there is induced not infrequently a temporary deformity which may pass into a permanent one if it be permitted too long. Also, in some instances from excessive exercise, the heart itself becomes enlarged, irregular in action, at first much too powerful, in the end too feeble. These are serious disadvantages, which creep gradually on, and often are not detected until it is too late for them to be remedied. There is another disadvantage which is more direct in its nature, that is, a dangerous degree of muscular fatigue followed by feverish condition, and followed again by a considerable exhaustion,—precisely, in fact, as if the person had passed through a fever, so that physicians sometimes speak of the condition as “fatigue fever.”

We have learned a great deal on this last point in the past few years. We have learned that unless the muscles have been brought into fair condition, not an over condition, they are very susceptible to a change of structure, which is, in its way, actually dangerous, a sort of suppressed or subacute tetanic state called, commonly, rigidity, stiffness of muscle. The unconditioned muscle, in wearing out under exercise of an extreme kind, becomes incapable of natural movement, becomes painful, and produces in itself positive toxic or

poisonous products, which have to be eliminated or thrown out of the body, and which act truly as poisonous products, causing fever and ultimate depression as a result of the fever.

I have more than once been called, as a physician, to see persons who have been suffering from this form of self-made disease, and I can assure you that it is not a disease to be considered trifling. In the lower animals we occasionally observe this disease from over exercise attended with fatal results, as in the horse that is over-ridden, or in a smaller animal that is too severely chased. We see the disease specially in the human subject in young folks who are training too intently, and in those old who take up some exercise of a severe kind, such as mountain climbing or cycling, under the idea that they are going to renew their youth and strength. We find it again in those who are fairly trained when they are endeavouring to make their muscles what is called hard,—like iron, as they boast, a condition which is quite a mistake to consider good, and which has led to the saying by the training fraternity :

“Overtrain, overstrain ;”

an excellent warning.

Fatigue fever has, unquestionably, many disadvantages. Once acquired it is easily repeated, and very often is repeated a second or third time from less disturbance than was created by the first invasion. Moreover, if it be severely felt it is a crippling agency, which, often repeated, disqualifies ever afterwards for any supreme physical effort.

Lastly, there are disadvantages of a mental character which call for consideration. It is always bad practice to let exercise, and particularly competitive exercise,

affect the mind too seriously. It is common for an enthusiasm of a most disturbing nature to connect itself with competitions. The mind becomes harassed by hopes and fears, loses its correct balance, and either is led to too exalted and hopeful an enthusiasm or to anxiety, fear, and depression. Each of these mental errors is apt to induce recklessness. The exultant man relies too much upon his powers, and goes wrong in that direction. The doubtful man thinks matters could not go worse whatever he did, and becomes rash from actual despair. In either case there is danger; and not a few go wrong altogether, and desert their studies under these perturbations of mind. It would be possible to point out many other minor disadvantages connected with the cultivation of physical exercise, but I have named the major ones, and they are quite sufficient to accentuate the lesson which should be naturally drawn from them.

EFFECTS OF SPECIAL EXERCISES.

I am led now to refer to certain special exercises and sports in their effects upon the health of the body, and in this direction I shall follow a division instituted by a recent most able writer, Professor Kolb, who, in his book on the "Physiology of Sport," has made a larger number of correct observations than any other writer with whose work I am acquainted. Kolb, himself a sportsman, mixing largely with sportsmen, gaining their confidence, observing their modes of life, and bringing to bear in his researches the finest instruments of precision, has brought the physiology of sport almost to mathematical demonstration. He divides the effects of sports into a series of classes. (1) In the first class he refers to physical acts, during which particular

groups of muscles are actively moved until they become affected, but without interference of a serious kind with the functions of the other organs of the body. (2) Exercises in which the breathing or respiratory system is exceptionally affected. (3) Exercises in which the motion of the heart and the circulation is primarily and most distinctly concerned. (4) Exercises in which the nervous system becomes particularly influenced, and in which that system is reduced in power or worn out by efforts of too severe a kind.

The exercises which influence the muscles purely, and which may be classified under the first head named above, are such as cause the muscles to move without serious change in regard to the position of the body on the surface of the earth : lifting weights, working dumb bells, and bell-ringing are examples of this sort. The body moves but does not progress. Kolb puts this well in the following way : "Let a strong man take a pair of dumb bells weighing about fifty pounds each, and move them from his chest upwards by stretching his arms. A man of common strength cannot do that at all ; our experimental man may be able to do it ten, twenty, or thirty times ; at last however the muscles refuse, that is to say, he can no longer move up the weight against the force of gravity. If we examine the man's pulse and respiration soon after, we observe the rate of his heart-beats to be certainly fast, being about 100 to 120 per minute : his respiration, too, is strong and deep, about 25 times a minute ; but neither his heart nor his lungs are strained at all. The muscular pains however that remain for days, and the feeling of lassitude, prove distinctly that the muscles have failed." All games of this nature produce the same effect. In young gymnasts who are practising climbing movements,

in men who are beginning to learn what is called the art of self-defence, in men who are learning sword exercise, this same condition of wearied muscle occurs, and in all such cases it is bad practice to keep up the exercise until actual muscular fatigue is developed. Nothing, in fact, is gained by overwork in this direction, for muscle is apt to get overstrained, and to lose that flexibility as well as strength which is essential for its perfect action. The golden rule here is that so soon as a muscle or group of muscles begins to be weary it is time to leave off action, for muscles should never feel pain in action, pain in movement of muscle being the most certain index that rest is immediately called for. Exercises of another kind belong to the second class named above, and affect primarily, and indeed chiefly, the muscles of respiration, the breathing muscles. Rowing, of which University men are so fond, is of all exercises the one which affects respiration. You will see a crew that has not yet been trained go out for active exercise, and as they get into the full swing of the work you will notice, if you are careful, how powerfully the breathing is affected. The breathing, you will see, is rapid; there is a sort of bluish pallor in the lips and face, and even when the act of rowing is stopped there is an out-of-breath condition which is felt, more or less, by all who have been doing the same work. Of course there are always differences in different rowers according to the build of the body. The man with a good large chest, and the tall man, the man who by a spirometer can show from 250 to 300 cubic inches without fatigue, will be infinitely less breathless than the man with a small chest and short body, and who can only blow 200 to 250 cubic inches; but, more or less, all will suffer, and the great danger of rowing

lies in injury done to the respiration in the first instance. If I were to select from a body of young men, promiscuously brought together, those who were best for a rowing match, I could, by proper measurement of the breathing power, of the height of the body, of the size of the chest, pick out almost without question those men who would make, in the end, the best crews, although at the time not one of them had become trained to rowing practice; and this is, I think, what ought to be done in the selection of crews for great competitions, since it is very bad for a young man even to train into a practice which by excessive exercise shall impair the function of the lungs. I do not say this from any prejudice, and I do not wish to exaggerate in the least degree. The disease emphysema—that is, rupture of the air vesicles of the lungs—which some think they have noticed as consequent upon rowing, I cannot say I have ever seen, and it is but honest to add that I have known an improved development of the breathing organs and of the capacity of the chest induced by moderate rowing. What I have seen, and what I would warn against, is an effect of rowing which shows itself in a persistent difficulty of breathing during the exercise, and which is followed by some shortness of breath in other efforts, such as walking and riding, playing at tennis or cricket, and such like exertions. Rowing, moreover, when it affects the breathing, is liable, secondarily, to cause disturbance of the circulation. The position of the rower in the boat is peculiar. His lower limbs are to a considerable extent fixed; his body is bent forward, and then strongly backward, the chest being kept in full tension. During these acts there is a considerable strain thrown upon the valves of the heart. The blood which has to course over the arteries

from the heart must ascend, before it makes its way anywhere over the body; ascends over what the anatomists call the aortic arch, and be prevented from going back into the heart on the left side by three valves, which allow the blood to come forth from the centre, but which, falling down, check it from being returned. But in the motion of rowing with the lungs charged with air, the blood rising through the arch is, in a sharp degree, thrown back upon the valves, much as occurs in water falling back on a tap, to which we give the name of the water hammer. So I have observed that in a man who has been briskly rowing, the second sound of his heart, which is produced by closure of the three valves, is often accentuated, owing to the sudden pressure exerted by the column of blood. Now this is a very considerable strain. By the influx of blood the heart is made to work more laboriously; it has an extra pressure put upon it; it is quickened in its action, and the great elastic blood-vessel, or aorta itself, is unduly distended. So in rowing men, there occasionally follows disturbance of the heart as well as of the breathing. The heart becomes unduly large and over-active, a state for which, in order to obtain recovery, the injured person may have to lie in a recumbent position for several months, and from which possibly he never entirely returns to health, but has an excitable state of the circulation when he is subjected to any particular strain or mental worry. Rowing, therefore, although a fine exercise, requires to be carried on with some prudence, and while I have not a word to say against it, but indeed very much enjoy the sight of it in a good contest, it is, I should like to intimate, an exertion which should never be persevered in if the signs of embarrassment, first of the respiration, and secondly of the

circulation, are clearly felt and detected by those who practise it; for I doubt if there is any going back to health in the strict sense of that term, when such signs are definitely pronounced and for a long time maintained.

The exercises or games which affect the circulation, and which come under the third head, include running, cycling, dancing, and football. The first of these sports—running—I cannot say much for from a health point of view; indeed, I am obliged to speak adversely in respect to it. Man was not constituted to be a running animal, and the irritability of the circulation induced by sharp running exceeds everything that would be expected of it. You are all aware that a runner on first setting forth has to get what is called his wind. He seems to be stopped by the fact that he cannot breathe fast enough; he pants for breath, and it is some time before he gets over this difficulty. The fault is not in the breathing organs, however; it is in the circulation. In order that a healthy feeling may be maintained, in order that there be no oppression, the balance of the circulation and the respiration must be properly set; the heart must send forth the proper quantity of blood that the breathing can supply with oxygen, or else the heart, sending over blood too rapidly, the breathing must be increased so as to adapt the one function to the other. If, therefore, the heart be set going at an unusual rate, and beyond the relationship of the breathing power, the balance is broken, and “the wind,” as the common saying goes, is imperfect or deficient. In running the balance is disturbed, owing to the sudden rapidity of the heart induced by the exercise. Supposing the natural beat of the heart to be about 75 in the person commencing to run, if he run briskly one minute, the circulation will go up to as much as 200, and at two minutes it may

reach the incredible rapidity of 250 or even 260 beats per minute. But the breathing, which in a natural state would be about one to four of the pulse, ought under these circumstances to increase proportionately, that is to say the breathing should rise to 50 or even 60 per minute; but this it cannot do immediately. It cannot rise with proportionate rapidity to the heart, and some time has to elapse before it reaches that maximum; so the runner has to wait to gain his wind, and then he can go on for a considerable time. When he comes to a stop, a new order of things prevails. The heart has become fatigued with the effort, and, instead of falling down leisurely to its natural stroke, it intermits—that is to say, there are four or five rapid beats of the heart and then a stoppage, followed by another series of quick beats and again a stoppage, until equilibrium is obtained. Under this condition the breathing comes down to natural action more steadily than the pulse, and most, if not all, runners are obliged at last to hold their breath at intervals, in order that the breathing may not be too rapid for the heart. It is fortunate that the breathing is, to some extent, under the power of the will, so that the accommodation can be met by a voluntary effort; if it were not so, fatal accidents after running would be exceedingly frequent. On the whole, running carried to competition is, as you must see, a dangerous exercise. I have known very bad effects indeed from it, telling always on the circulation. The heart becomes enlarged, and, more than that, it becomes irregular, which is a very bad state for those who suffer from it. I have, in fact, never met with a man who practised running for a long time who had not an irregular circulation or an intermittent one, and in whom the heart was not very irritable or very enfeebled; nor do I think that perfect

recovery from this injury to the circulation is ever actually witnessed. I should, had I my way, exclude running from all athletic exercises.

Cycling has something of the same effect as running—that is to say, it tells upon the circulation. In a very short time, during rapid cycling, the heart is brought into extreme action, the beats of it rising under great pressure to 200 or even 250 per minute; and when the active career of the over-enthusiastic cyclist is shortened, with the occasional collapse of a man in full exercise, the fact is due generally to the overwork of the heart. I have for many years past been cautioning cyclists on this matter. I have been criticised for my pains, and have even been charged with doing injury to the exercise by the advice I have given; but I have never had any reason to change the line I have pursued in this matter, my very love for the pursuit giving an impetus to the emphatic way in which I have dealt with it. It has been a hard fight for me to offer opposition on this subject; it has been a clear task to predict consequences; and I regret that far too often the predictions I have made have been too faithfully fulfilled. Still men go on, and it is my duty once more to take this opportunity of warning men of all ages, not to give up cycling, for that would be the greatest pity, but not to overstrain at it. Long and severe competitions of cycling, in which the exercise of full speed is kept up for many days, may excite the admiration of lookers-on who sympathise with the sportsman; but there is a certain end to it in derangement and disease of the circulation; which is inevitable. The heart gets unduly active, the arteries become unduly distended, the elastic tissue of the arteries, and of the body generally, loses its spring, and then the body becomes

prematurely old and broken down. Lately, too, the cyclist has got into the very bad habit of bending forward at his work, so that the spinal column takes an unnatural shape, which is often a prominent deformity, and which gives to other exercises and games an ungainly action. Sometimes, again, locomotion of the body in walking is made ungainly by cycling, and is impaired considerably for pedestrian feats. While, therefore, I put cycling forward as a good exercise, one in which I myself indulge, and always with pleasure, because it enables me to travel twice the distance, and with greater facility, than I could on foot, and because it affords much gratification of movement, I warn against the peril of overwork from it. When the cyclist goes so far or so quickly that the effort he has made produces an undue sense of fatigue ; when his limbs are restless and twitching after he lies down in bed ; when he wakes from a troubled sleep feeling that he is more tired than he was when he went to bed ; then he gets the best indications he can get that he has been doing too much, and he may take my word for it that he cannot repeat this many times without doing himself injury.

Dancing has the same bad effect upon the heart and circulation when it is carried to an extreme degree. Added to that, in our modern life there is the risk attendant upon dancing in closed rooms, where the air is hot and close, and where there are so many inducements to indulgence in stimulants and late hours. Football follows the same rule ; I have more than once had occasion to trace a long and severe attack of irregular circulation and strained circulation in the young from this outrageous exercise.

Horse-riding by its action on the heart is in a lesser degree hurtful to the circulation when it is made too

much of a task. Those who engage in what is called the sports of the field—hunting or racing—are very liable to injury of the circulation, and many of the sudden catastrophes which occur in the chase are due to sudden failures of the heart or rupture of a vessel. In riding, that action of the blood already spoken of, in which the column of blood is brought down upon the valves of the heart, and in which the great artery is distended, is much promoted by the repeated descent of the body upon the saddle. So, in old days, when we had a race of postboys, who were always in the saddle, dilatation of the aorta—aortic aneurism, so named by physicians—was of such frequent occurrence that it was actually called “postboys’ disease.”

Walking and climbing affect chiefly the nervous system, and men leading a studious and sedentary life are easily injured by sudden attempts to perform feats of strength of a climbing or pedestrian order. The lungs may be competent to meet a great deal of work; the muscles may be in a fair condition; but the nervous system, which gives the impetus to the muscular, which fires the shots, if I may say so, that keep the muscles going, is not in good working order. If it has been worn out by study, by confinement, and by close air, under the exertion of walking or climbing it begins to fail. The student says to himself, “When I have finished this student’s task, I will take a good spell of exercise in walking or climbing; I will go to some mountainous district, and breathe at a great height the strong mountain air.” He sets forth resolutely, and is astounded to find how much sooner than he expected he is fatigued. He thinks it cannot be that he is worn out, and so he keeps on until he can do no more. Then he is incapacitated, and returns to his work feeling weaker

than ever, and ashamed that other men have apparently beaten him in the race. I have seen this effect in men of all ages; in the student from college, in the middle aged, in the more than middle aged. I am certain I have seen many years of life taken out of men, certain I have seen insomnia, restlessness, and general feebleness, from the strain here noticed; and I put the facts before you, as men going into the world, in the most earnest manner, that you may not fall into error, by ignorance of results.

I have no time to dwell on other games and sports, what may be considered minor games or sports, such as lawn-tennis, bowls, cricket, skittles, golf and croquet. These, which are very fine exercises, are much less liable than any that I have named to cause acute disease, and some of them are model games, in that they bring into play the muscles of the body in great groups, and afford a valuable exercise which is at all times desirable. I consider it a great pity that bowls have so much fallen into disrepute. I think it a great benefit that cricket holds its ground, and I commend lawn-tennis as an admirable game.

EXERCISE IN UNIVERSITY LIFE.

Before I close, I must deal with the question of exercise generally on university life. I think I have already said that it is always advisable to exchange physical with mental exertion, so that the body may rest on the mind, and the mind on the body in turn. I have said also that my own life has been greatly benefited by following such interchanges, and I dwell on them as a necessity of a good and healthy university career.

One day at table, not long since, I heard a number of learned men, each of whom had established himself in

life favourably, discussing the question whether it were more advantageous to the future successful life of the university scholar to be first stroke or first wrangler. These men were all well acquainted with university life—most of them had gone through it; and the conclusion they arrived at from their recollections was that, numerically, the most successful men were those who had attained to the position of being first stroke. There is nothing improbable in this view, since the youth who develops the best organisation is really the best fitted to fight his way in the world and gain the first place. In all the professions, strength to hold your own is the great element of success. In the law it is obviously the fact that the strongest man physically—being, of course, well-grounded mentally—is the first. The same is largely true in political life, it is strictly true in medical, it is probably true in the Church, and it is unmistakably true in the public services. We have therefore to consider how, without interfering seriously with university studies, we may make the physical life the best that can be made.

Let us look at this matter for a moment longer. It is unnecessary to say more about strain and overstrain; it will be most profitable to look upon the common modes of life in feeding, drinking, clothing, sleeping, habits of the bath, cleanliness, smoking and similar indulgences.

The practice of subsisting on excess of animal food, and taking heavy meals whilst training for manly exercises, is strongly to be condemned. The diet should be of a mixed kind, with, if anything, a tendency to vegetarian fare, and the meals should be equally divided into four moderate portions per day in nearly equal quantities, so that the nervous power required for

digestion of the best kind of food, and for athletic work of the best kind, may be equally distributed. As to drink, water pure and simple is undoubtedly the very best. Alcoholic drinks only add to the work of the heart, and, as I could show you, indisputably, if I had time to deal with and demonstrate the work of the heart, they only impose so much more labour on the work demanded by the competition or exertion itself. They are apparently, at first, stimulating, they are in the end enervating, and destructive of those finest qualities of mind and body on which so much depends. This is not merely theoretical doctrine, it rests on practice, and I have learned it, as others have, by observation of phenomena. It is illustrated throughout creation, for, as you know, the strongest animals in the world, and the most rapid for movement, achieve all their physical efforts with water alone as the driver of their organic mechanism.

For covering the body during exercise the substance of clothing should be porous, so as to allow the freest transpiration from the skin, since suppressed skin action is most hurtful. When you are selecting clothing, draw a piece of the material over your mouth and feel sure that you can breathe through it without the slightest effort, breathe as if there were nothing in the way as an obstructive. You need not be afraid of cold from such material, for it soon becomes, from its porous nature, charged with air, which is one of the worst heat conductor of any substance, and is therefore the warmest and coolest of all: the best in winter, the best in summer.

For good work plenty of sleep is essential, seven to eight hours being really necessary.

“Sleep, which knits up the ravell’d sleeve of care,
The death of each day’s life, sore labour’s bath,”

not only gives new life but is the one and true remedy for fatigue. Even when fatigue produces that "fatigue fever" spoken of above, with poisoning of the body from the dangerous products derived from muscular waste from over-exertion, sleep is the true cure. Therefore sleep long and well.

Let every care be taken to avoid mental excitement in competition. To anticipate too much, to strain too much, to manœuvre too much, is always false, false in competitions of every kind, mental or physical. For both mind and body it is a golden rule to let trials come naturally, and to trust to natural not strained powers.

Lastly, let all over-indulgent habits be put aside whenever you want good, wholesome work to be done. You ask me should smoking be put aside. I answer yes. Smoking, I admit, does not cause degeneration like alcohol, but it spoils the finer adjustment of the mental and bodily powers, and it is not in character with correct nervous and muscular functions. It may do for idle hours, it cannot do for active ones, and altogether it had better not be acquired or maintained as a luxurious habit. I need hardly say that the bath is a good aid to exercise, and that after vigorous exercise the cold douche is an excellent assistant, equalising the circulation and tending to induce perfect sleep.

And now let me conclude by saying that good, active sports and exercises, in reason, are amongst the choicest means of maintaining a long and happy life, and supply the most natural justification of the poet who sang :—

"The wise for health on exercise depend :
God never made His works for man to mend."

OPUSCULA PRACTICA.

RULES FOR THE PREVENTION OF CONSUMPTIVE DISEASE.

A SANITARY DECALOGUE.*

T the present day an article of medical faith once much accredited, the contagiousness of pulmonary consumption, has been revived, and various rules based on the belief have been put forward in an almost exclusive form. Similar rules were adopted many years ago in Italy, but owing to their exclusiveness and absolute character failed to produce the effect that was intended. In the following rules, which I have been asked to draw up for the Ladies' Sanitary Association, I shall not attempt in any way to dogmatise. Although for many years physician to a hospital for consumption, not one single case has ever come under my observation showing the direct contagiousness of the disease; and my colleague, the late Dr. Leared, who made this question a special subject of enquiry, had practically a similar experience. Many others have, with us, had the same experience; but as we may have been blind to evidence, and as the rules for prevention offered by the contagionists do not differ from ours except in their

* Ten short rules drawn up at the request of the Ladies' Sanitary Association, November 16th, 1894.

exclusiveness, they will be embodied, apart from any hypothesis, in what is about to follow. Most of the rules supplied (ten in number) were published originally by me in *The Sanitary Review and Journal of Public Health*, as far back as 1855-6, and were republished in a separate volume in 1857, under the title "The Hygienic Treatment of Pulmonary Consumption."

RULE I.

Pure air for breathing is the first rule for the prevention of consumption.

This rule carries all others before it. No room called cosy, with the temperature at 70° Fahr., with every crevice closed, and with an atmosphere in a dead calm and laden with impurities, should be permitted, either as a living-room or bed-room. Every effort should be made in every household to ventilate freely the rooms in which people live and sleep. In every bedroom there should be a fireplace, the chimney of which should always be open; the windows should be open during sunlight, and full circulation of air permitted. The greatest care requires to be taken that the room is free of dampness. If an indication is shown of dampness on the walls, glasses, or furniture, it is a sign that the air of the room requires frequent fires. Precaution should likewise be taken that dust be not allowed to accumulate in the atmosphere of a room, and that all articles causing the gathering of dust and holding of dust, such as heavy curtains, picture frames and cornices, should be excluded. Carpets that hug the wall should always be avoided, and at least one foot of bare flooring, thoroughly varnished, should be present between the

edge of the carpet and the wall. No room ought to play the double office of bed-room and living-room, and the bed-room, in which a good third of the life is spent, should be the ariest, brightest, and cleanliest in the house.

RULE II.

Active exercise, outdoor as much as possible, is essential for the prevention of consumption.

Outdoor life is one of the best preventives of consumptive disease. Walking is the true natural exercise, since it brings into movement every part of the body, causes a brisk circulation, and promotes active nutrition. If distance prevents getting out into pure country air, cycling is a very good means of attaining the benefit. On damp days, when going out is impossible, indoor movements, like calisthenics and dancing, are good, but always in the purest air obtainable.

RULE III.

Uniform climate is important for consumptives.

The soil should be dry; the drinking water pure; the mean temperature about 60° Fahr., with a range of not more than 10 or 15 degrees on either side. Shelter from northerly winds is advisable, and residence apart from crowded populations is very preventive, as consumption is more frequently developed fatally in cities than in the country. In England the excess of the disease in cities has been found 25 per cent. greater than in the country. Climates which are equable—high and dry—give excellent results. The disease does not flourish in arctic regions, nor in such very cold regions as the Orkneys, Shetland, and the Hebrides.

The disease is most prevalent at the level of the sea, and decreases according to height above the sea level. In this country it is most common and fatal in the spring months, when variations of climate are most keenly felt, and when the atmospheric changes are the most trying and treacherous.

RULE IV.

The dress of the consumptive should sustain uniform warmth.

The clothing of consumptive persons should not be heavy, but should cover as much of the body as possible. It should be permeable, as in porous cellular clothing, which is always coolest and warmest; and it should fit loosely on the body, so as to exclude all tight-lacing, and everything that impairs the free motion of the chest and limbs. In damp foggy weather a porous kerchief, like a small Shetland shawl, worn as a respirator, is good.

RULE V.

The hours of rest should be carefully regulated by the sunlight.

Consumptive persons should go to bed early and rise early, so as to get as much as possible of the best of all purifiers and revivifiers—sunlight. The morning air is of the greatest use, and an early morning walk, even in a town, is of extreme value. The bed-clothes should be light and porous. Porosity is of real importance, and should always replace such tempting but unhealthy coverings as the impervious eiderdown quilt. Each person should have his, or her, own bed. It is always bad for two persons of any age to sleep in the same bed.

RULE VI.

Outdoor occupation is preventive.

The occupation of the consumptive person should be, as far as possible, out of doors. Of 515 cases of consumptive disease observed by myself 68·34 per cent. of cases occurred amongst persons following indoor occupations. All occupations in which dust is distributed through the air are most detrimental to consumptive persons.

RULE VII.

Amusements of consumptives should favour muscular development, and sustain healthy respiration.

This rule is very important. Amusements should be out of doors as much as possible, and should not be carried to so extreme a degree as to cause fatigue. Indoors they should be carried out in a well-ventilated room, and at reasonable hours. Such exercises as bring the lungs into play without strain are good ; thus reading aloud is always good, and singing may, with prudence, be carried out beneficially. Playing upon wind instruments is not advisable.

RULE VIII.

Cleanliness in the broadest sense is of special moment.

The body and the clothes that cover it should be kept scrupulously clean, and all uncleanly and slovenly habits should be avoided. The bath, tepid, or just agreeably cold, should be resorted to frequently, so as

to keep the skin persistently clean. Underclothing should be frequently changed, for health will not be clothed in dirty raiment. Every act of vicious sensual indulgence should be avoided, since the grosser the sensuality the greater the physical evil arising from it. Parents and teachers in schools should especially remember this truth. In cases where consumption is developed, all clothing and articles connected with the sick, and all things connected with uncleanness, should be scrupulously removed, so that they come not into contact with other persons. It is specially urged that expectorated matter, or sputum, from persons afflicted with consumption, should never be allowed to remain and dry, so that its particles can diffuse through the air. Handkerchiefs used by consumptive persons should be immediately removed and cleansed, or, what would be better still, pure white paper handkerchiefs, like those of the Japanese, which can be destroyed at once, should be brought into use. Spittoons should be most carefully washed and cleansed if they be used, and spitting upon the floor, or in any public vehicle, should be avoided, not only as a filthy, but as a most unsightly and unhealthy habit.

RULE IX.

Every precaution should be taken to avoid colds.

I do not remember ever seeing the commencement of symptoms of tubercular consumption without a preliminary cold. Getting accustomed to pure air, and plenty of it—getting inured, in fact, to outdoor cold—is, on the whole, a good precaution against taking cold. But sudden exposures to heat and cold, to draughts and to wet, are always dangerous. In the spring much

danger arises from changing the clothes too rapidly from warm to cool suits. It is best never to overwrap the body with clothes at any season, but it is specially bad to make sudden extreme changes. It is also bad to get wet feet, or to keep on damp shoes and stockings. It is most injurious for women to wear the chest covered up all day, and in the evening to go into heated rooms with the chest, shoulders, and back uncovered.

RULE X.

The diet of consumptive people should be ample, with full proportion of the respiratory foods.

With consumptive persons digestion is often capricious, since, as Dr. Arbuthnot well observed, "respiration is a second digestion." Fatty and oily foods, foods of the respiratory class, should predominate. Fresh butter with bread, if it agrees, may be taken freely, and cream is excellent; curds and cream are also excellent. Milk, when it agrees, is the best of beverages; fresh vegetables, and fruits, and roasted apples, are always advisable. Alcoholic drinks should be avoided altogether. Meals should never be heavy; four light meals a day, with the food pretty equally divided as to quantity, is the best form. All foods should be well cooked, and the milk should, on every occasion, be boiled before it is taken. Mere luxurious habits are inadvisable for consumptive persons, and none more so than smoking.

"BONA STAMINA VITÆ."

REMEMBER making a couplet for a lecture on "Health and Vitality," which may perhaps deserve to be remembered:

"Strength at birth,
Length on earth."

The longer I live, the more distinctly does daily experience teach the truth of this principle. Of all things conducive to length of life, heredity, strength of birth, holds the very first place, and when the great Thomas Willis, in the case of the children of James II., put the statement ironically in different words, "*Mala stamina vitæ*," he was evidently conversant with the truth, and could not help expressing it, though he lost Court favour by the candour of his remark.

Once in casting some calculations based on life assurance records, I collected the history of five hundred individuals whose deaths were recorded side by side with their parentage, and the results were most valuable, as bearing on what may be called the commercial value of life. They showed that within a certain range the combined years of parentage, if divided by half,—accidents of course being removed from the calculation—presented fairly the life-value of the offspring. Thus, if one parent died at 80, and the other at 60, 70 years represented the value of life in the person springing from that parentage. In 7 cases out of 10, or, in other words, 70 per cent., this calculation was correct within a range of 7 years on either side. In a similar number of cases where grandparentage could also be obtained, the results were still closer if the age of grandfather and grandmother on one side,

as well as that of father and mother, could be procured, the result of division by 4 indicating an average within a range of 4 to 5 years; thus if the age of the father were 80, the mother 60, the grandfather on one side 72, and the grandmother on the same side 60, the estimated value of the life on division by 4 would be 68 years; and this was the value within a range of 4 years. But the most critical, and some would say painful, results came out when the ages of all the grandparents, as well as of the parents, were reckoned up and divided by 6; as, for example, when the parentage was 80 and 60, the grandparentage on one side 72 and 60 and the grandparentage on the other 62 and 50, the result on division by 6 would be 64 years; a result which would be within the range of 2 years, and probably the closest result, commercially speaking, that could in any way be obtained. These figures would indeed be painfully exact but for one saving clause. I noticed that when parentage had arrived at a good age there was tendency on the part of the offspring to improve on it. Thus, if two parents died, the one at 74, the other at 70, the average would be 72; but the figure would come out, accidents excepted, at 78 or 79. On the other hand, however, if the average ages of the parents were short, say 40, the tendency was for the life of the offspring to be still shorter, by 2 or 3 years.

As a matter of course these estimates are largely varied by external circumstances, as by accidents; by the occurrence of acute fevers and contagious diseases, which may, in a sense, be considered as accidents; by intemperance; by suicide; by false legitimacy; by adverse circumstances in life, and by other of the natural ills that flesh is heir to. But taking foundations for life as they exist in nature, we may calculate more

safely than by any other method, duration of life on the root of life; so that if external influences could be set aside—and they are sometimes set aside—parentage and grandparentage may be accepted as the soundest of all calculations that can be afforded for forecasting the lives of individuals. If insurance companies could, in every instance, obtain the precise facts from six stems of life of all who come before them, they might, by a side calculation of accidental disturbing causes, arrive almost at the mathematical value of life in each case brought before them. From time to time there would be some variations, no doubt, owing to improved surrounding conditions or environments; that is to say, with a higher and better civilisation there would be an improved length of life; with a lower and more degraded civilisation, a degeneracy of life. But this would not materially modify the course of events within two or three generations, and tables could be formulated which at least would represent sixty years of time, or something near to two generations of a nation.

I regret much that circumstances prevented me from carrying out the details of this enquiry to the extent demanded, and I publish it so far in order that some one else with more time and means at command may take it up and carry out the work in a truly comprehensive manner. Such an enquiry will bring more conviction as to the truth of the saying,

“Strength at birth,
Length on earth.”

THE IODINE DISINFECTING BOX.

IN recommending Iodine Disinfection for the sick-room a few weeks ago, I was written to by a medical friend to know what was meant, and how the box was made or by whom it was manufactured or sold. I assume from this fact that the box, simple as it is, cannot be so widely known as it ought to be, and, therefore, at some risk of repetition I reproduce a short article on the subject in 1863, which I read before the physiological section of the Newcastle meeting of the British Association for the Advancement of Science in that year.

For disinfecting purposes iodine may be used as a solution in spirit, in which case rags are dipped into the solution and suspended in the room requiring to be disinfected. But the most simple way is to use it in the solid form, or in extreme cases in the form of vapour. Used in the solid form it is simply necessary to place one drachm, or the eighth part of an ounce, of iodine in a cup, glass vessel, or common chip box, and covering the vessel over with a piece of gauze or muslin, to place it on the mantelpiece of a room. Or a little iodine may be placed in a china or glass ornament on the mantelshelf. In time the iodine thus placed becomes diffused throughout the air of the apartment, which it thoroughly disinfects if any organic matter be present. When rapid disinfection is called for, the iodine may be placed on a porcelain or a common plate or saucer, and the heat of a candle may be applied underneath. The iodine is thus driven off in a violet-coloured vapour, which quickly diffuses through the air of the room, and rapidly destroys the organic products which are the cause of the disagreeable odours.

Iodine acts in the same manner as chlorine, bromine, and active oxygen or ozone. It is nearly as powerful as chlorine, and when diffused by means of heat, quite as powerful. It is much more readily applied than any other disinfectant, and does not seem to be deleterious, as chlorine is, to animal life. It appears to produce little effect on gilded and metal surfaces, but it stains marble and white-painted surfaces when it comes too directly into contact with them. It should therefore be placed at a distance in a glass or earthenware dish.

Iodine must not be understood at any time as replacing ventilation, for it has no chemical influence on the product of breathing known as carbonic acid, and it would be a mistake to suppose that because it destroys the bad smell of a close apartment it prevents the necessity of opening the windows. But combined with good ventilation, it destroys organic impurities, and gives a freshness to the air of a house like that which is experienced from the air of the sea. Indeed, it has been assumed that in sea-air iodine is present, and that the value of sea-air depends on this circumstance.

Iodine may be used successfully for another purpose, viz., in cases where the breath is foetid. The metalloid may be placed in a smelling bottle, which may be occasionally inhaled from to such an extent as not to produce dryness or soreness of the nostrils or throat. I have known it thus applied with great and immediate advantage, and have found it destroy almost at once the disagreeable odours arising from the eating of onions and from smoking tobacco. I have also used it, on the suggestion of the late Dr. Wynn Williams, as an application to foetid and indolent ulcers and sores on the human body. In hospitals, at the instance of the late

Mr. Hoffman, of Margate, it has been employed in the beds of the sick in some cases, as where there are extensive bedsores. In these cases the chip box is employed, the box containing the iodine, and covered with muslin, being placed under the bed-clothes. To this process there is one objection,—the sheeting becomes tinged of a brownish colour; a discolouration removable, however, by washing the sheets with water containing a little soda.

In a word, iodine may be considered as one of the readiest and the best of all disinfectants.

*PICKING OF THE BED-CLOTHES IN ADVANCED
STAGES OF DISEASE.*

FOR many years the phenomenon of picking the bed-clothes by the patient has been considered a dangerous symptom, and one indicative of dissolution. As a general fact it is indicative of dissolution, but it is not so absolute a sign as some have supposed. Five or six times when it has distinctively been present, and for some hours persistent, I have seen recovery, and many recoveries after more transient manifestations of it. I have also seen it recurrent in the course of a disease. In a patient who recently suffered from relapses of enteric fever the phenomenon was present several times at intervals, when death seemed most imminent, but when rallying took place the hands and fingers became quiet and even natural.

The phenomenon is peculiar in that it is ever of the same kind. I have always seen it in both hands, never in one hand singly. It is a sharp movement,

and seems as if it were intended for the picking up of something from the bed-clothes, but it is obviously not intended for such purpose unless the affected person sees something, or thinks he sees something, that others do not see. The facts indicate that in all cases it is the same nervous centres that are at fault, but what centres these are is a question to which, at present, there is no reply. It must be the higher centres; for when patients show the sign they are always more or less unconscious, and when they make partial or complete recoveries they have no remembrance of what was in their minds or what was their intention during the aberration. The motion seems to depend on some act in which the hand follows the eye; the eye, without being reasonably influenced, appears to detect something at a little distance that troubles it, a spot, a vibrating or moving substance it would like to have removed, or the presence of which gives annoyance. Whatever it may be that causes the annoyance it is usually connected with the clothes that cover the sick person and that lie immediately before him. I never saw the pillow picked up, nor the bed-curtains, nor the coverings below the trunk of the body; it is always an object within reach of the hands. When the arms are stretched out, and when the fingers and thumbs clutch a substance, as a piece of fluff from the blanket, the object is for a moment, in many instances, held up as it were, and inspected by the sufferer. The most common accompanying symptom is jactitation of the muscles of the forearms and hands. I doubt, indeed, whether the phenomenon ever occurs without jactitation; but as there is no proportionate relationship or intensity between one and the other at the same time, it is possible that the connection is no more than

a coincidence. Nor is the sign, to the best of my understanding, one connected with any particular morbid state or disease, unless we are to consider gradual sinking or collapse from any disease as a common condition to every disease. The motion is an aberration rather than an involuntary activity, and probably indicates mental, rather than physical, failure. It is not choreal, it is not convulsive, it is not tetanic, and it is, in a morbid sense, voluntary and without pain. I never saw it under a volatile anæsthetic, but I have seen it induced by alcohol during delirium tremens, which occurrence suggests the idea that the cause of it is due to the presence in the nervous matter of some foreign body that has specific toxic properties—mercaptan, alcohol itself, or some other of the alcoholic series.

As a prognostic sign in disease the phenomenon of picking at the bed-clothes is a bad sign. It is not easy to overrate its badness, and it calls for a great deal more study than has ever been given to it.



TRACHEOTOMY AND DIPHTHERIA.

WE have had a very singular and happy experience during the past few months at the Temperance Hospital, in the results of tracheotomy in the late stages of diphtheria.

In the Temperance Hospital we profess not to receive infectious cases of disease; but it not infrequently occurs that patients under infectious diseases are brought to the Institution in the last stages, as a last resource, such as cases of diphtheria, in the advanced

stage. Under such circumstances we do not refuse admission, but we place the sufferer in a small isolation ward at the top of the hospital and do our best to meet the symptoms. We have recently admitted five cases, consecutively, in which, death being imminent from obstruction in the larynx, tracheotomy has been promptly performed. In every one of these cases recovery has followed the operation. Beyond extreme care and watchfulness on the part of the nurses, nothing in the way of new treatment has been adopted, except the entire exclusion of alcoholic stimulants in any form be considered a new mode. Milk diet has been relied upon, and with eminent success. The success after tracheotomy tallies with what I have seen in private practice, and opens the suggestion that tracheotomy is a curative measure, not merely by its admission of air into the lungs, but by allowing such admission without the passage of air over a decomposing surface.

The cases have all been those of children under five years of age belonging to the poorer classes, and their recoveries have been in every respect satisfactory, with a short period of convalescence. Three of them were unquestionable diphtheritic cases.

CRAMPS AS A SIGN OF DIABETES.

DR. UNSHUL has called attention to a symptom which I have been for many years familiar with, and ought long ago to have recorded, namely, cramps in the lower limbs in cases of diabetes. He says the symptom occurs in 21 per cent. of cases. I have not reckoned it up, in

this manner, but I suspect he is near to the truth. I agree with him in observation that the cramps are rare in the daytime ; most common at night, or during the night ; and very painful, although not of long continuance. He speaks of them as if confined to the muscles of the calf of the leg ; but I have known them to occur in the other leg muscles, especially the extensor longus pollicis, by which the great toe is very painfully drawn up. I have observed the symptom also in the extensor longus digitorum. Connected with these spasmodic symptoms there is another sign, which the patient does not feel, and which is therefore not known to him until it is pointed out ; that is, a painless motion or twitching of the leg muscles, observable mostly in the early morning after good sleep, and lasting two or three hours, but passing away during the day. In some cases these movements, which are most marked in the gastrocnemii, will be so rapid that as many as thirty or forty of them may be seen during a minute. When either cramps, or painless motions of the kind named, present themselves, the urine should be examined for sugar.

BLEACHING OF THE TONGUE UNDER PEROXIDE OF
HYDROGEN ADMINISTERED MEDICINALLY.



CURIOUS phenomenon is observable in regard to the tongue when peroxide of hydrogen is administered for long periods in medicinal doses. The tongue under the administration becomes moist and of *milky whiteness*, the fur, as it is commonly called, becoming whiter than cream. At first I thought this appearance might be connected with disease, although to my eye it was

novel; but it has recurred so steadily now for so many times after the peroxide administration, there can be no doubt as to its being the effect of a definite cause. It has been most manifested in cases of enteric fever, in which the medicine has been given in two-drachm doses of ten volumes strength, well diluted, every four or six hours for several days, and it is a good sign that the medicine is taking effect. No harm is indicated by the appearance, but it is a usual proof of a favourable condition with breath free of taint, and the teeth of sordes. After the medicine is withdrawn, the white condition clears off, in six or seven days, leaving a moist and clean surface.

*SUBCUTANEOUS INJECTION OF OIL IN CASES OF
STIFFENED JOINTS.*

IN two instances of stiffened joints where the inability to move the limb has appeared to arise from rigidity of the tendons and muscular sheaths, I have injected, subcutaneously, olive oil into the structures, and with some success. I find that a fluid drachm of oil can be injected around the knee joint without causing any after inflammation or discomfort. In one instance where the elbow was operated on in this way, the patient, a young woman, obtained for the first time some degree of movement after six months' entire fixation from rigidity.



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W. A. Greenhill,

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WILLIAM ALEXANDER GREENHILL, M.D.

IT is not often that the opportunity occurs for enrolling amongst the great men in medicine one who has lived in our own time, and who deserves to be included among such a selected list as that which has appeared from time to time in these pages. But Dr. Greenhill, of Hastings, was in many respects so remarkable a man, and has added so much of the best learning to our medical and general literature, it were impossible to let his name pass out of immediate memory without a fitting tribute to him and his labours. He was a man who was great all round: a literary scholar; a practitioner of medicine; a veteran sanitarian. I have known him intimately since 1855, when he became a contributor to my old *Journal of Public Health and Sanitary Review*. To him, during that long period of forty years, I could refer for any particular information that might be at his command; and from him I always received the assistance needed. Not infrequently, also, he did me the honour to refer for suggestions on various points upon which he himself was engaged, and in which he thought I might render him, in return for his services, some little service of my own. It was a long interval of friendly companionship, a friendship never for a moment broken or to be forgotten.

Dr. Greenhill first saw the light at Stationers' Hall on the first day of the year 1814. His father was the principal executive officer (Secretary) in that famous institution, and there the boy received his rudimentary scholarship. In the year 1828 he went to Rugby, the year in which Dr. Arnold entered upon his duties as head master. "I entered Rugby," he once laughingly said to me, "when you entered the cradle, and I hope you enjoyed your life as much as I did mine." Like many other boys, he formed the most sincere attachment for Dr. Arnold, and formed such a fine estimate of the character of that illustrious teacher, it is much to be regretted that his description of him is not left more extendedly on record. He remained at Rugby till 1832, and then, after an exhibition, he went up to Trinity College, Oxford. From what he told me personally, I do not consider that he formed any great attachment to Oxford, as a school, nor to his classical studies there. He considered that what he was taught was narrow, stilted, and difficult, without being progressive; and he contrasted, with much feeling, the good effect of the teaching of Dr. Arnold compared with the influence of University teaching. He consulted Arnold on the subject of University work, and received from him very sound and seasonable advice.

When the choice of a profession came before Dr. Greenhill he chose medicine, and putting aside attempts to obtain other degrees, took in 1840-41, that of M.B., following it up by the degree of doctor of medicine in 1842, and settling himself to the practice of medicine in the city of Oxford. Why he took to medicine as a study and a practice it is somewhat difficult to explain. He told me he did not go into it from the first as a profession in which he intended

to make himself particularly eminent, but that, taking it altogether, it suited his quality of mind best. There were certain reasons why he did not feel he could enter the Church; he did not care to enter the Law, to plead good or bad causes according to his instructions; and, he had no taste for commercial life. He had artistic likings and a decided turn and tendency for literature; but literature in his student days was nothing by which to live, except in case of a man who had a particular genius for engaging the popular mind, and this was not his strong point. He was a scholar; a biographer; by nature an historian. In a certain sense, he had very strong descriptive capacities, but he did not write in such a form as to be fascinating to the public taste, and there was a certain want of that imaginative and ideal presentation of mental work that was necessary for immediate success.

Although Dr. Greenhill became connected in the first place with medicine, after the manner described, he was, as might be expected, a conscientious and devoted physician. He was attached as physician to the Infirmary at Oxford; gained a very fair practice; and while in practice there married Laura Ward, a niece of Dr. Arnold. I doubt not that the duties of medicine occupied his first thoughts, but his diary, which at this moment lies before me, tells that more than medicine entered into his mind. I note the first passage. "1846, April 18th, Saturday. I propose for the future to keep a register of my doings in this place, the time of my coming and going, and the way in which I am employed here, in the expectation that it may perhaps hereafter be interesting to refer to in a literary point of view, and also in the hope that (with God's blessing) I may hereby be rendered more and

more watchful over my time. May I have grace to conduct my work as in God's sight, and direct it to His glory and the welfare of my neighbour." At the moment when that passage was written, for his own private meditation and as a test of himself in after years, he had no expectation that, over half a century later, it would see the light; for he was a nervous and reserved man, looking forward for the recognitions that were to come, rather than for the immediate publication of things that concerned his own identification as one of the moving and obvious powers of his own generation. I quote it as a passage showing the true soul of the man, his inner self, at a moment when he was just becoming a medical scholar, reading up the life of Cheyne, studying Rhazes, and, for matter of modern literature of a medical type, Brodie's lectures on pathology. At this early time Cheyne and Rhazes very much occupied him. Cheyne's was a life of considerable interest, not extremely difficult to follow; the life of a man of eccentric parts, but of genius and common sense, with just a touch of dry humour, which his critic enjoyed at all times. Rhazes was a harder study, involving Arabic, and respecting whom he drops on a new volume of Ibn Khalliken "just in time to be of use. *Laus Deo.*" At this early period, also, he was looking out translations of Hippocrates for Adams of Banchory, was collating an Arabic MS. for Dozy of Leyden, consulting with Strickland about Aristotle, looking up details respecting Sydenham, preparing articles for Smith's *Dictionary of Greek and Roman Biography*, and setting to work for conducting an examination at Harrow.

Greenhill's life in these years, and unto 1848, must have been a life of dream amongst the classical dead.

For Smith's *Dictionary* he was ever busy, and in some of his lives, contributed to that work, he was evidently fascinated above the ordinary. Synesius was one of the men who gave him special pleasure; he finished it on June 14th, 1848, with the remark in the diary: "An article which has given me a great deal of trouble, but which has also given me several delightful proofs of God's goodness to me, for without His special assistance in many points, I should have made the article imperfect and erroneous."

The mode of expression here conveyed shows that the author was imbued with intense religious feelings, a fact which my own personal intercourse with him in later years never for a moment discovered, nor even suspected. Towards all such feelings he seemed to me negative, and he certainly never conveyed them. They were the secret outpourings of a heart that was truly sincere; and they who may feel them least themselves are bound to respect them, if for no other reasons than for their concealment in perfect sincerity.

In August of 1848, date 29th, he records that he was looking for a passage in St. Augustine for the prayers for the medical profession, which he afterwards published; and on November 14th of this year, he began to translate the Arabic version of Galen, or, as he afterwards called it, the "Arabic Galen." For a long time his diary is filled with daily references to this grand work, which was to him ever afterwards a fact and remembrance singularly grateful. I believe there was nothing that pleased him more than any reference to this early literary love. "Worked at Arabic Galen" is the regular entry, varied on January the 19th with a diversion for a brief interval of the day, with "canvassing about the election at the Infirmary for twenty minutes." In July 1849,

work at Galen began to slacken, to be replaced on the *Population of Oxford*, on Percival's *Medical Ethics*, and on Burton's *Anatomy of Melancholy*, which led him into the year 1850.

As 1851 approached, he began to see his way towards leaving Oxford, and removing to Hastings. His health seemed to demand the change. To the very last he laboured on assiduously in the Bodleian, not unfrequently, however, falling asleep for twenty minutes or so over his labour. On Tuesday, March 7th, 1851, he closes his diary as follows:—

“Removed my papers ; gave up the key of my desk ; read for the last time Psalm xxiii., which has for so many years been my daily comfort among all my labours in this place. Henceforth I shall visit the Bodleian only as a stranger ; but thanks be to God for all the mercies vouchsafed to me, here and everywhere. Amen.”

If we turn to the short Psalm xxiii., we see the bent of his mind : “The Lord is my shepherd ; I shall not want,” and so on through one of the most perfect poems ever composed by mortal man.

Before I leave the reference to my friend during his long Oxford career, it is right I should notice one or two other facts which bear materially upon his life. I should state that in 1836-7 he left Oxford and paid a visit to Paris, where, for a time, he studied medical science and practice. His residence there was not very prolonged, and from an observation he made about it to me, bearing on an essay of my own relating to the life and discoveries of Laennec, I rather infer that he was not greatly impressed by the Parisian schools of his day. He certainly did not consider them in any way superior to the English and Scottish schools of medicine.

France, in fact, did not seem to agree with him, and his residence in the French capital may be considered rather as a holiday, or diversion, than the serious part of a medical student's academical career.

There are some details of an extra-medical kind which occurred to him while at Oxford. He lived there in a critical and remarkable period, during which a religious, or rather theological, discussion and practice were in the birth of revolution. Dr. Newman, afterwards the famous Cardinal, was, during Greenhill's period, Vicar of the well-known St. Mary's Church, and Greenhill, who lived opposite All Souls' and St. Mary's, was churchwarden to Newman, and remained so until the latter gave up his living. The two men were at that time close friends, and although for many years afterwards they entered into no direct personal communion, they remained friends until the Cardinal died. The teachings of Newman had, without any doubt, an influence on the mind of Greenhill, who had been an early member of Dr. Pusey's Theological Society established in Oxford in 1835. Beyond a transitory inclination towards the specific doctrines of Pusey and Newman, Greenhill, however, was not led away to any extent from the established doctrine, whatever that may be, of the Established Church of England. We might, perhaps, say now that he was rather "High" in his Church opinions, but he did not carry them to an extreme. He certainly was not of the Low Church, neither was he Broad, for on the question of Broad Church he differed so widely from his fellow-student at Rugby and Oxford, Dean Stanley, that he practically separated altogether from this old colleague, although retaining a most friendly feeling for him, and ever speaking of him as one of the grand lights of the day,—a man of surpass-

ing charm, force, and, to some extent, originality. I remember giving to him, incidentally, a little sketch of a New Year's dinner which I had with the Dean at the residence of the Hon. Mrs. Stanley,—now Lady Jeune,—and telling how the Dean amused us by the information that there was legal provision for an officer in the Church who should rank above an Archbishop, namely, the “Vicegerent in Ecclesiastical Affairs,” who should hold a position between the Archbishop of Canterbury and Her Majesty; and how we had laughed and said the Dean himself ought to be raised by Her Majesty to that position with re-establishment of the office. Greenhill was greatly diverted and impressed by the observation, declaring that, in all probability, the Dean was quite in earnest and quite correct; speaking of him at the same time as one of his old and warm friends, and asking many questions as to his appearance, his health, and the different other topics he would be sure to raise at table, with some good ghost story as a grand finale. It seems to me, not to make a long history of it, as might easily be done, that between Dean Stanley and Dr. Pusey, Dr. Greenhill steered a middle course, holding his own conscientious opinions, which were so inflexible that one of his biographers, since his death, has quoted, in respect of his conscientiousness, a saying applied to him in his youthful days, that “if it were proved to Greenhill that it was his duty to hang himself, he would do it.” This conscientiousness, combined with resolution, industry, and minutest attention to details, made him always a power, and commonly a very effective one, though sometimes a little wearisome.

In 1847, when Mr. Gladstone stood for the University, it was his good fortune to have the services of Dr.

Greenhill as chairman of his committee. In this position he allowed party politics to play a minor part in the election, in so far as he was concerned. His admiration for the abilities of Mr. Gladstone, and for the brilliancy he would be sure to confer on the University as its representative member, led him entirely, and to his very last this admiration did not in the least degree wane. There was no man of whom he spoke with more feeling, or with greater emphasis of admiration, than of Mr. Gladstone. His sympathies were with the great statesman in every particular until Home Rule came across the scene. On this political question his natural aversion towards going into extremes led him into what he considered caution. He would not attempt to forecast anything in the future, nor even to hope that a radical change in the constitution would be of any lasting service. On the contrary, he feared that change of constitutional government, by which two parliaments would exist in the same kingdom, might lead to contentions that would know no end; and, he argued—I am speaking now from personal conversation, in which he knew that my opinions were not his own—that, while every grievance should be removed from Ireland, the government of the two countries should be from one centre, leaving it to time to unite the two islands more intimately, by physical union, such as direct railway communication, and by mental combination and heart. He thus became what is called a Liberal Unionist, and he wrote a gay letter to me when I lost a seat for which I tried at Walton, Liverpool, congratulating me on my real success—in a loss which would save me “time, labour, and life.” Still, though his views ran in an opposite direction to those of the

great parliamentary chieftain, his recognition of the tremendous powers and far-seeing intelligence of that chieftain never slackened. "I think he has for once gone astray, but I only think," was his severest criticism.

I am not at all sure that the Tractarian movement had not something to do with the removal of Greenhill from Oxford to Hastings. Reasons of health, there can be no doubt, had much to do with the change of residence; but what amount of physical disorder led to it it is not easy to say with precision. He was a man who never liked to be thought ill, or to have anything like "fussation" made about his health and strength. He was a man, also, of a retiring nature, who got wearied of controversy, and of that kind of personal controversy which leads, if not to bad, to painful feeling and argument. He, therefore, got tired of Oxford, of the controversies going on in it, and of beginnings the ends of which he could not clearly foresee, into the spirit of which he was not strongly inclined to enter. His inclinations, therefore, physical and mental, were for a new sphere, and as he believed that Hastings, a home on the shore of the sea, where, he was accustomed to say, there were several climates according to location, would suit him. Hastings tempted him most; and, his mind made up, he settled for life in the place he had chosen. He took up residence, in the first instance, in Carlisle Parade, Hastings, and, apart from his medical and literary work, helped in public work as in the building of Trinity Church, and in the organisation of the parochial duties belonging to that establishment. He went with the determination to practise as a general physician, and purchased the practice of Dr. Mackness, a practitioner

who had been for many years in the town, who was held in great esteem, was considered by all a sound man, and who, from taking part in various philanthropic works, had earned the reputation of being a philanthropist; an accomplished gentleman, worthily ambitious to do many things that would improve Hastings, but who, being before his time, only partially succeeded in his meritorious endeavours.

My own acquaintance with Dr. Greenhill commenced at Hastings some little time after he was well established there. In 1855 I published the first number of the *Journal of Public Health and Sanitary Review*. This was a venture novel of its kind, and in fact was the earliest periodical sanitary work published in this country. I commenced the preparation for it twelve months before it appeared, and had correspondence with most of, perhaps I may say all, the well-known sanitary men then existing in this country, amongst others Dr. Greenhill, whose labours in regard to Oxford had greatly interested me. In addressing him I explained the design of the work, and took his opinion upon it. To my great delight he wrote me a most friendly and thoughtful letter, agreeing warmly with the plan of the Journal, and commending especially a department named to him including reports on cities, towns, and districts, with their average mortalities and conditions of health. He promised me that he would contribute at least one short paper in this department, with special reference to the town in which he had recently become located, namely Hastings, and in my first collection of manuscripts for Volume I. of the Journal, I held a paper from his pen, in which he carried out the promise he had made, and adding a second communication later on. He opened by observing that

while the health of every town, or village, concerns its own inhabitants, there are many places whose sanitary conditions may be supposed, for certain reasons, to be interesting to the whole community. He considered that Hastings was one of these, on account of the great number of invalids who annually resort thither, especially during the winter season. In continuance of his report he indicated that the average rate of mortality in Hastings, according to his own calculations, might be reckoned at either 18·39 per thousand, or 18·87 per thousand, according to the mode of estimating the population. The last estimate was, in his opinion, most probably correct, and was therefore adopted by him. The highest rate of mortality was 28·23 per thousand in 1849, that being a year in which Asiatic cholera had been very prevalent. The lowest mortality was 15·80 per thousand in the year 1854. In females the highest mortality was 22·96 per thousand in 1849; and the lowest 15·14 per thousand in 1854, the average from 1849 to 1854 being 17·63 per thousand. The deaths amongst males were more numerous, and the death-rate, including both sexes, for one decade, 1845-54 presented the average of 20·32.

With his usual keen analytical sense Greenhill pointed out that the mortality in the sub-districts of Hastings was not what might have been at first sight expected. He was prepared to find the fewest deaths in one rural sub-district called Ore, but the mortality was, in fact, rather higher in this than in either of the other two sub-districts, being 19·61 per thousand. Tracing out the cause of the higher mortality, he found it depended on the deaths in the Union Workhouse situated in this sub-district. Again he expected to find the mortality in the sub-district

of All Saints, the oldest and poorest part of the town, higher than in the newer and more fashionable sub-district of St. Mary in the Castle. To his surprise the reverse was the fact; the deaths in the older district being 18·48 per thousand, and in the fashionable sub-district 19·00 per thousand. Searching into the cause for this variation, he traced it to the mortality occasioned by the large number of visitors who died at Hastings, most of whom lodged in the better parts of the town.

In the course of this short report he made a very good observation on the matter of the natural and philosophical division of the year into seasons, for medical and sanitary purposes. He considered that division into seasons is far more important than the arbitrary and official division into quarters. He took December, January, and February, as winter; March, April, and May, as spring; June, July, and August as summer, or the hottest period, and September, October, and November as the autumn. The average mortality was lowest during the summer, namely 15·92 per thousand. It increased in the autumn to 18·29 per thousand. It rose in the winter to 19·45 per thousand, and reached its maximum in the spring at 21·62 per thousand. These observations in respect to seasons are rigorously correct, and should be followed up by all statisticians who wish to be precise on the subject of the relation of season to disease. The greatest number of deaths observed by Dr. Greenhill in Hastings was caused by tubercular disease, and by the zymotics. The mortality from tubercular diseases, especially phthisis, varied but little in the various seasons. The deaths from the zymotic class were most numerous in the autumn, but in the winter and spring the number

of deaths was much increased by diseases of the nervous system and diseases of the respiration.

From the commencement of our literary and scientific friendship Dr. Greenhill and I became connected very closely almost up to his death. But I did not personally know him until the year 1857. In the latter part of February or beginning of March in that year I was at Hastings on my wedding trip, and thought it only right to call upon one who had so warmly interested himself in my work, and who, in fact, had sent me every quarter a systematic statement of the prevailing diseases of the town in which he lived. I had some little hesitation in making my first visit to him, for I was told that he was a very reserved man, and that sometimes he was very critical. Moreover, I have at all times a most painful diffidence in calling upon strangers. But just before I left Hastings I took my chance, and was so fortunate as to find him at home. He received me with the greatest kindness, and lent me, I should think, an hour or more from his much occupied time. I said little, but heard much, and was deeply interested in the extraordinary details into which he entered on subjects widely diverse. Of course I had been informed of his learning; that he was one of the best Arabic scholars in the country; that no one had used the Bodleian Library at Oxford more assiduously, or was better acquainted with its contents; that he read Latin and Greek with nearly the same facility as his native tongue; that he had contributed largely to Smith's *Biographical and Classical Dictionary*; that, in his early life, he had edited the *Physiology of Theophilus*; that he had edited the works of Sydenham in Latin for the Sydenham Society; and that, in short, he might be considered as the one distinct classical scholar in

medicine. Perhaps he was pleased that I was content to learn from him, for certainly he never showed a trace of that reserve, coldness, or cynicism which some had led me to expect. He was then forty-three years of age, and in his prime; very active in his movements; very precise in his mode of speech; but at the same time full of good nature; witty, and quite enthusiastic on certain points of a physiological kind bearing upon the blood, on which he knew I had been for some time successfully engaged in my own lines of research. He was very particular in his inquiries about the London men of medicine who took a marked place, but with few of whom he seemed to be personally familiar. He was anxious in his inquiry about the work done by the Epidemiological Society, and considered that the venerable President of that Society, the late Dr. Benjamin Guy Babington, had contributed an immense service to English literature by his translation of Hecker's *Epidemics of the Middle Ages*. He had conceived a great admiration of Dr. Latham, and asked me many particulars about his fellow literary *confrère* Dr. Robert Willis, with whom he knew I had been associated, and with whose translation of William Harvey he had made himself very familiar. I gathered from him that the learning of Willis impressed him, that he had the greatest respect to the Harveian work, and that they had a sincere esteem for each other. Then we got into conversation on the progress of sanitation, which he considered ought to engage the minds of all men and women, whether they were medical or otherwise; and he was good enough to refer to a paper of mine in the *Sanitary Journal*, on "Prevention and Cure," as being very acceptable to him and in accordance with his own views. Before we parted we came

to the discussion of some points bearing on practical medicine, during which he disclosed to me, briefly, but with singular lucidity, that his wide practical knowledge, though he seemed to hold it somewhat in disregard, was quite marked as an accomplishment, and that his love of books of antiquity was not so unkind as to separate him from the medical studies of the current hour.

WORKS OF DR. GREENHILL IN LITERATURE.

It is almost impossible to give too high a place to Dr. Greenhill as a medical scholar. It is probable that, taking him all in all, we never had in medicine so remarkable a scholar, one possessed of such classical erudition. I reckon up, without rising from my chair, a number of works on which he was critically engaged, which, after passing through his hands, would take many years of labour even to read. There is the edition in Latin of the *Translation of Theophilus*; the Latin edition of the works of Sydenham; the *Polygot Syllabus of Medical Nomenclature*; the *Treatise of Rhazes on Small Pox*, translated from the Arabic; the numerous contributions of medical biography, from A to Z, in *Smith's Biographical Classical Dictionary*; the careful and beautiful edition of the *Religio Medici* of Sir Thomas Browne; the *Prayers for the Use of the Profession of Medicine*; the contributions to the *Volumes of National Biography*; the article on Leprosy in the *Popular Educator*; the essays on the health and mortality of Hastings in the *Journal of Public Health*, and in the Report of the Hastings Health Congress in 1889; the Contrast, Duty, and Pleasure of Right and Wrong; and the inquiries supplied to the Sussex Archæological collections; to say nothing of various incidental letters,

notes, short papers, and addresses which have not been preserved, but which were often of great value.

We have had some men in medicine who compare with him—namely, Sprengel, Freind, Robert Willis, Adams, and Mason Good—but I somewhat doubt whether they reached his unusually high standard. His knowledge of Arabic was quite peculiar in its way, and separated him from previous scholars; while in Latin and Greek he was the equal of any of his medical predecessors. Again, we have to take into account the wide scope of his learning. It had, perhaps, more of a biographical than a purely historical character, but biography is history, the very best of all, and he endeavoured to utilise it to the fullest extent. He was, I think, also very impartial in his readings of men and their writings. Some men, truly, he admired more than others. He was a great admirer of Percival, whose medical ethics seemed to have made a lasting impression upon his mind. He had the sincerest liking for Sydenham, whom he looked upon as the first living exponent of practical medicine after the renaissance. Of ancient writers Rhazes and Galen were his favourites, though Theophilus came in for a good share of favour. But I think of all men of the past whom he loved most Sir Thomas Browne stood, in his estimation, highest of all. His index to Browne's works "*General and Glossarial*," is one of the most curious additions to the works of any author that I remember to have seen, and indicates how truly he must have loved his task. The preface, also, which he adds to the *Religio Medici*, conveys to the reader the tenderest feeling, the notices of former editors of the *Religio Medici*, with the chronological table of dates connected with the original work, forming a compact little work of themselves.

Sir Thomas Browne seems to have been as familiar to Dr. Greenhill as Greenhill was to himself, and he appears never to have forgotten a single point relating to his favourite writer that provoked interest. I remember once speaking with him about the *Evening Hymns* of Browne and Bishop Ken, claiming for Browne that he stood before Ken, not only in the matter of date, but also in the matter of the simple beauty of the poetry. In the notes on the *Religio Medici* he touches on the same subject, at page 289, where he compares "the beautiful and well-known evening hymn of Bishop Ken with the hymn of the *Religio Medici*, beginning :

" 'The night is come, like to the day ;
Depart not Thou, great God, away.' "

And he explains there, as he did to me, that as Browne and Ken were both Wykehamists they probably derived their inspiration from the same source—the *Hymni Ecclesiæ*, with which they must have been familiar. I could find in the notes on the *Religio Medici* any number of quotations of similar interest, but I really must not be tempted to do more than suggest to any Esculapian brother of learned taste that he cannot spend a leisure hour better than in taking up Greenhill's edition of the *Religio Medici*, and comparing the author with the commentator. It will often be a trial to his judgment to discover who holds the first place.

Of some men considered eminent and truly famous he held original and opposing views. Jenner, for example, so much belauded by many, he told me he never could admire. He thought John Hunter industrious, but rested there ; William Hunter was to him as distinguished a man as John, and he held me as correct in having written that both William and John

were great, but William was the firstborn. Arbuthnot "was a fine fellow;" Xavier Bichat "grand."

His eye was peculiarly quick at any omission, technical errors, or accidentals in literature, and I was grateful to him for many critical notes which he was good enough to send me spontaneously. Here, for example, is a note I have had lithographed; it has reference to an accidental omission of a word in a quotation in one of the numbers of the ASCLEPIAD.

Hastings, Nov. 19. '88.
 The omission of "longa"
 after "nova" spoils the
 verse, which is in Ho-
 race's Odes i. 28 at the
 end. W.A.G.

Another similar brief note runs as follows:

"Page 62. The Gold-headed Cane was written by Dr. Macmichael."

WORK AS A SANITARIAN.

As a sanitarian Greenhill began to figure about the year 1849, when the cholera broke out at Oxford. During the epidemic there he took an active part in

dealing with the disease, and he gave considerable assistance to the series of reports on the mortality and public health of Oxford, with its appendix containing the account of the cholera epidemic. This document was prepared for the Ashmolean Society, and dealt with the statistical facts in the possession of the authors. Dr. Acland, now Sir Henry, in his well-known work on the cholera at Oxford, published in 1854, spoke with great commendation of the labours of his colleague, Dr. Greenhill. Amongst other efforts of a sanitary kind, Greenhill endeavoured to induce the French Government to register the causes of deaths, after the manner of the English system, introduced originally by Sir Edwin Chadwick, and successfully planned and conducted by the late Dr. William Farr. He had an interview on this matter with the Minister of Commerce and Agriculture in France, M. Dumas, with whom he held a very interesting conversation, and influenced so far as to induce him to form a Commission of Inquiry into the possibility of adopting the method,—an inquiry abandoned, however, in consequence of the fall of what was then known as the Baroche Ministry. He afterwards, at an international and statistical congress at Paris in the year 1855, took part in the committee that had for its consideration the nomenclature and classification of the causes of death. Five years later, namely in 1860, at a meeting in London, he, jointly with Dr. Sutherland and the late Dr. MacWilliam, acted as Secretary of the Sanitary Department.

But it was in Hastings itself that Greenhill performed his best sanitary work. I have already recorded his estimates of the rate of mortality in the place, but I have not referred to the practical measures he undertook there in order to bring the vitality of the place

to a better pitch than that in which it stood when he entered it. He found a beautiful locality presenting what he considered a very high mortality, owing to municipal neglect,—indifferent drainage, indifferent water, and the bad housing of the people in the poorer districts. Mr. Edward Cresy, superintending inspector to the general Board of Health, had held an inquiry into the sewage, drainage, water supply, and sanitary condition of the town in 1850, and his report greatly influenced Dr. Greenhill, who thereupon determined that many of the evils complained of should no longer be existent. He urged, and not without effect, the improvement of the main drainage and water supply; he did more, he lent his own individual energy, with the assistance of a few friends, to improvements in the homes of the people. The result was the formation of the Hastings Cottage Improvement Society, which has for about thirty-five years produced a considerable change in the sanitary condition of the town. To these labours may be added endeavours of a purely philanthropic character. It is inevitable when a man becomes a sanitarian that he becomes also a philanthropist, even though the subject of philanthropy be not specially a part of his nature, since all that is sanitary goes naturally to the benefit and civilisation of mankind. But Greenhill's tendencies passed beyond this mere necessity. He worked with spirit and without pretence at simple charitable aidances. He took an active part in the formation and support of the Mendicity Society, by which help was given to those wayfarers who entered the town and who had no fixed abode there; and he was ready at all times to give his assistance and influence to charity in every correct phase of its development. In this kind of

benevolence he was, as in his literature, extremely inquisitive and precise, which led some to say that he was too exacting even in charity. Certainly he was never gushing, and never accompanied almsgiving with the ornamentation of ostensible sweetness of disposition. He spelt charity in a clear, round, firm hand, without the slightest flourish; but, on the plan of not proclaiming his acts from the housetops, he kept silently at work without letting his left hand know his right hand's labour.

There was, with it all, about him a conscious pride, coupled with a quiet self-consciousness of merit, which filled his nature. I recall vividly one happy day spent with him in Hastings, when he took me round to describe to me the great improvements that had been introduced in the dwellings of the poor by the H.C.I.S.—the Hastings Cottage Improvement Society. He described from Cresy's report of 1850, what had then existed in the localities we were visiting,—conditions not indeed fitted for animals of the lower creation; and as he showed me what now actually existed he was almost enthusiastic at one moment on the vast improvement that had taken place. In a more subdued tone he added, "I fear that in your sanitary eye, and with your ideal fancy of Hygieopolis everywhere, you are not very much satisfied even with the present state of things; neither am I, but I assure you the improvement, by contrast, stands out boldly, and for the moment is a fact of advancement which brings much hope with it in the moral change for the good of the people, the reduction of mortality, and the better health and comfort that prevail." A few days afterwards he wrote me a note saying how pleased he was that I was so contented; he had led me to see, and hoped it was "real content," "not mere courtesy," I had spoken.

WORK AS A PRACTICAL PHYSICIAN.

Greenhill held in medicine three important public positions. He was Physician to the Infirmary at Oxford, to the Infirmary at Hastings, and the Hastings Home for invalid gentlewomen. He was for a time honorary secretary to the Medico-Chirurgical Society of Hastings and to the Sussex Medical Friendly Society. In these positions he was in the right place, and held them with distinction. I have heard it said, however, that he was a scholar—which could easily be said without thanking anyone for saying it—but was not a practitioner. The criticism is one from that fool's calendar which is more easily and readily spoken than proved; one recalling the fact that it is the custom of the dull idiots in every art to declare, as a sort of cover to their imbecility and ignorance, that "they do not pretend to be learned, because they are practical men." Greenhill knew these gentry right well, and set his teeth at their complacency very hard indeed. I wish some of them could have heard him. In point of fact he was a very true and sound practitioner, cautious in prognosis and exceedingly cautious in prescription. His very precision was, to the vulgar, his failure. Having, professedly, spare originality in devising means of cure, he was critical to a degree of many means that were proposed, holding fast only those which were proved to be good. He considered it morally wrong for anyone to put so-called active medicinal substances into a human body for the mere sake of doing something and of appearing to help the sick person by such blind treatment. The plan, he admitted, often answered in a worldly point of view, but he had no sympathy with

worldly points of view alone, and would rather be poor with precision than rich with *ad captandum*.

A FINAL CHAPTER.

It is very hard to write even a short notice of one who has been a friend and fellow-student for so many years. It is difficult to stop and it is equally difficult to proceed. We measure our lives by the lives we think of most dearly, and although Greenhill was many years older than I, the loss of him is as the toll of a bell heard at a distance not too far away to be indistinct. He was never in our time what is considered a popular man, never a notoriety, never an idol ; but—

“ Let not my love be called idolatry,
Nor my beloved for an idol show ”—

I candidly believe that in the solemn future he will be one of the few brothers medical who will sail visibly down in the current of the ages. The work he performed is of a nature permanent, and little as it has seemed adapted to the mind and temper of his time, it is destined for a nobler time as a light that will live. Greenhill had his anxieties, his domestic sorrows. His first daughter died of pulmonary consumption ; his son, an Oxford student, died after a surgical operation ; and his wife, broken down by these painful events, quickly followed them. These griefs depressed but did not vanquish him. He retired from practice to find a sweetly quiet home in The Croft, Hastings, a beautiful home, which all who visited it will long remember ; a home endeared by the gentle and loving kindness of his daughter Kate, his housekeeper, his all in all. In 1880 a memorial presented to Mr. Gladstone, and which had two years before been unsuccessfully laid before Lord

Beaconsfield, praying for him a modest Government pension, met with a favourable response, and in the last decade of his life he had what he desired of all things most, rest in work, work congenial to his literary taste and lasting fame.

A few years ago, being in London on a visit to his attached friends, Professor and Mrs. Tweedy, he called upon me, and consulted me about a deafness from which he suffered. A trifling operation was followed by much relief, but he was then aware that, as he expressed himself, "the sand was running out fast." Yet his spirits remained high, his love of learning untarnished. He continued the same on to Tuesday, September 18th, of 1894. On that day he felt rather tired, and on Wednesday morning, September 19th, 1894, seized with a difficulty of respiration, to which he occasionally had been subject, he sank, in his eightieth year, beneath the load of life, and died—before medical aid could be obtained—ready to exclaim with Tully: "*O præclarum diem, quum ad illud divinum animorum consilium cætumque profisiscar quumque ex hac turbâ et colluvione discedam!*"

FOUNTAINS OF MEDICAL SCIENCE AND ART.

ON THE DRESSING OF WOUNDS SPEEDILY TO PREVENT THE
ACCESS OF AIR.

 BELLOSTE, Surgeon Major to the hospital of the French king's army in Italy, in his work "The Hospital Surgeon," published here by Sprint and Nicholson, Little Britain, and A. Bell and R. Smith in 1713, dwells emphatically on the treatment of wounds by exclusion from the air. The following passages (pp. 57-70) tell their own story.

"It were to be wished that wounds were covered with something at the times of dressing, which might perform the office of the scarfskin, and exclude the acid and viscous particles of the air, together with the other noxious effluvia with which it is filled; for if these exhalations floating in the air are the original of so many diseases, as some modern philosophers affirm, why may not they occasion very dangerous symptoms, when they take hold of, and cleave to, alive and sensible parts? Now, in regard these foreign particles are capable of alterations no less than the air itself, we may be assured that the ill qualities which this has contracted in hospitals, by the breath and transpiration of the sick, are also communicated to those, since such atoms have a substance and a certain form.

These carbuncles that are so frequent in hospitals of the army, are a sufficient proof of what I say. They are occasioned, as some think, by the arsenical * particles in the air, which, being taken in by respiration, are thrown out by the strength of the natural heat upon some emunctory. Now, since this falls out much oftener in hospitals than elsewhere, we may infer that the air also is here much more replenished with these subtil and impure particles, by reason of which the wounds (ill treated), without very great care, become sometimes cancerous, always putrid, and often fistulous and incurable.

I have learned by my long frequentation of hospitals, that those places where the sick have remained for some time retain long after they are gone the ill smell communicated by them. This, I believe, is owing to the impure particles that stick to the walls; whence, those who design afterwards to live in the place, are obliged to plaister and whiten the walls, that they may not be hurt by the pernicious effluvia proceeding from them.

Clothes and other goods, brought from places where the plague is, must be cleansed and purified from the pestilential particles that cleave to them; without which precaution, they might excite a general pestilence in the places to which they are brought. It is this which inclines me to think that the nitrous and viscous quality of the air resides in those particles or atoms; which, if they are capable to stick to a body so smooth and polished as a wall, and that for a long time, without losing either their bad smell or ill qualities, much more will they do so to a wound uncovered, which is always moist, and where they may get easier hold and act more

* Meaning poisonous or toxic.

readily, because of the tenderness and weakness of the parts.

The dead flesh of any creature, if it is often handled and exposed to the air, suddenly putrefies ; and a foetus, a member, etc., if it be kept in a close vessel covered with spirit of wine, may be preserved for ever ; whereas, on the contrary, a little air will dissolve it, and reduce it to nothing.

That the air is a mighty enemy to wounds, is a truth owned by the modern practitioners of surgery, no less than by the ancients ; but there are few take sufficient care to hinder its access to the wounded parts. Knowledge is in vain when not put in practice. Nevertheless, this is a thing so absolutely necessary in the cure of any wound whatsoever, that without it nothing that a surgeon's art can perform is to any purpose, but all is hurtful and destructive.

From what has been said, consequences may be deduced very useful in practice. All the regard I have for antiquity was not prevalent enough to keep me from declaiming against an abuse, though established by custom ; for truth depends on the things themselves, and not on the opinion the ancients had of them. I know many have expressed themselves on this subject much after the same manner as I have done. Celsus, who ought not to be reckoned among the moderns, has written something that looks this way. In his book of " Wounds of the Skull," ch. iv., he says that flesh breeds easily enough in any part of the head, except a little above the space between the eyebrows, where often there remains an incurable ulcer, because in that place there is a cavity of the bone full of air, bordering upon the *os cribrosum*, which air hinders the filling up of the ulcer.

By all this then it evidently appears that the air is a powerful impediment to the cure of wounds, and that the speedy method of dressing ought to be preferred to that which is yet in use in many places. And to conclude, it is certain that the pain caused by the use of a tent, its remaining in the wound, the length of time taken up in dressing, and the frequency thereof, of which last I shall speak in the following chapter, are the genuine sources of all the accidents that attend wounds. Wherefore, we must dress speedily, and according to our method, if we would prevent many dangerous inconveniences.

THAT WOUNDS OUGHT TO BE DRESSED SELDOM.

Galen, in his fourth book of the "Composition of Medicines," ch. iv., orders to dress ulcers but once in three days. This method he acknowledges to have come from Asclepiades; and I cannot but wonder that such a practice has found so few followers, considering it is so necessary and advantageous for the patient.

If ulcers require not to be dressed every day, as this author thinks, fresh wounds do yet much less call for it. Nevertheless, it is the custom, in almost all hospitals, to dress regularly twice a day; and, I believe, there is scarce one to be found that does otherwise, excepting that of Brianson, where they dress the wounded, some only ONCE a day, and others but once in two, three, or four days. If I had found this method hurtful I would not have been so wicked as to continue using it, much less desire that others also might do the same.

Pareus (bk. 13, ch. ii.), treating of ulcers, seems to be much inclined to the opinion of Galen, when

he disapproves frequent dressing; and yet in his eleventh book, chapter the fifth, speaking of gunshot wounds, he orders to dress them twice a day, and often once every eight hours.

It is surprising that so famous an author as Pareus, who believed the air extremely prejudicial to wounds, and adduced many passages from the ancients to support that opinion, should have left behind him rules altogether repugnant to it. But it is probable he was so busied in compiling so great a work, that he had not time enough to make the necessary reflections upon this subject, which requires a very diligent application; and this may be the reason why in many places he contradicts himself.

"Fabricius ab Aquapendente," p. 1, bk. 2, ch. vii., discoursing of the way to preserve the substance of the parts in simple wounds, affirms again and again that it is enough to take off the dressings once in three or four days; which he confirms by the authority of Galen, where he treats of the cure of putrid ulcers.

It is certain, that the seldomer a wound is dressed, the less it matters, provided it be not stuffed with lint or some such thing: the remedy also has the more time to communicate its virtue to the part, which seems in some sort to be nourished thereby; and the nutritious juice has more liberty and time to restore the lost substance and to reunite the divided parts. On the other hand, if it is often dressed, the strength of the remedy being destroyed, and its virtue diminished, it becomes so weak that it has no effect, and its moisture running away, like the sap of a tree when it is pierced, is mixed with matter, and turned into pus.

What Nature does in uniting broken bones, may instruct us what we ought to do in the curing of

wounds; we see that a callus is bred without the assistance of anything, by the wise contrivance of Nature only, if so be that she is not by frequent dressing, or indiscreet motions of the part, diverted from her work.

When the little fibrous threads begin to be formed in a wound, in order to unite the parts that are divided, and the nutritious juice is communicated to the part, to restore it to its natural state, if then the part is often disturbed with frequent dressing, if the wound is searched with the fingers, or with a probe, or a dry tent, etc., what Nature has done will be bruised and separated, and the work destroyed as soon as begun; so that if this method is continued, the nutritious juice becomes thick and hard, and cleaves to the sides of the wounds, where it forms a callosity, and often a fistula.

Generation then, which is the principal work of Nature, cannot be accomplished without rest; so true is it that repose is necessary to her in all her operations. Hence it is that I cannot apprehend by what reasons they are influenced, who by frequent and painful dressing, without any necessity, exasperate the wounds; and I protest I could never myself endure so cruel a method. Sometimes they search and sound them with their fingers, sometimes with an instrument; and not contented with this, if they fancy they have found anything, desire their friends present, and their boys, to do the same; and in this miserable condition is the wretched patient detained, sometimes an hour, and that most frequently twice a day. I dare not venture to name the places in France, Italy, and Germany where I have seen the wounded used in this manner, and that by such as held very considerable posts, where a good method was extremely necessary.

At last, after much time has been spent in raking into the wound, they think they are bound in credit, for the satisfaction of the wounded and the bystanders, to draw out something, and show it publicly, lest they should seem to have laboured in vain. Now if it should chance that at length any little piece of corrupted membrane is found which would not be strange in a wound dressed after this manner, where corruption often causes great disorder, it is drawn out with abundance of ceremony, and the operator fails not to declare, with great confidence, that this was it which occasioned the restlessness and pain of the preceding night. And now, you must think, the wounded person is half cured.

Heavens! what abuse! Is it possible that any man can be so much imposed upon? I would gladly understand what it was that did separate this shred of a membrane, or these fibres, etc. It will be answered, without doubt, that it is Nature, which, endeavouring a reunion, rejects that which opposes it. I demand again, how was it brought to this place? By the same Nature, will one say. And why will she not go and drive that extraneous thing quite out of the body, seeing she has done so much? She is able to drive out bullets, though fastened in a bone (as I shall show in the second part), to expel splinters, yea, to bring them to the orifice of the wound, and that a considerable time after it has been closed up; why should we then apprehend that she will leave such things within, from which she may so easily free herself, either by the orifice of the wound, or by some other more convenient way? For 'tis certain that Nature, left to her liberty, ever takes the nearest way. Besides, all the parts of the body have an elasticity, or spring, whereby any foreign

thing is naturally driven from the centre to the circumference.

Anthony Benevent, a physician of Florence, relates that a certain woman swallowed a very large needle, which two years after came away by her navel ; and Tarentus, a physician, also reports, that a maid, who had swallowed a needle about four fingers' breadth in length, voided it ten months after by the urinary passage.

From hence it appears, that the industry and sagacity of Nature surpasses that of all the Esculapian family : she knows what she does, and wants not to be instructed in the ways she ought to take, in order to drive out of the body whatever oppresses her, or is foreign or noxious unto her. The surgeon ought only to employ his utmost care to understand and follow her : he must study her designs, and take all care not to divert her from her enterprises, considering she does nothing in vain.

After what I have said concerning Nature, I would not have any to think that I am one of those that regard her as a deity, and ascribe to her a reason, whereby she disposes of all her wonderful works. Reason I take to be a peculiar privilege of human soul ; neither am I of opinion of Empedocles, that whatever she does is mysterious. It is he that Aristotle, in his third book of *Metaphysicks*, ridicules for giving no other reason for many things that were asked him, but this, that it was Nature's pleasure. All I say is, that if her operations are marvellous, they are owing to her powerful Author, who has entrusted her with whatever we have that is precious.

But to return to my subject. It is fit I should advertise to my reader, that I would not have any follow my method of seldom dressing, unless first he hath entirely laid aside the use of tents and dilaters, which, by retain-

ing the matter, would cause a fermentation, whereby these same tents and doffils would likewise be corrupted. This is what fell out not long ago in a cure to which I was called ; the dilaters that had been used were carried along with the matter that was discharged between the muscles, and there putrefying, the corruption was quickly communicated to the neighbouring parts : whence it appears, that this method is attended with peculiar and inseparable circumstances that must not be neglected.

M. Verduc, in his Pathology, tom. 1, fol. 439, advises not to do as some surgeons, who every minute are opening the wounds of those who are under their care ; for, says he, by too often taking off the dressings we hinder their reuniting, and give occasion to the air to insinuate itself into the wound, and to coagulate the nutritious juice. This indeed is a most just and reasonable thought. I remember when I was at Rome, in the year 1678, I chanced to see a little book, written in Italian by the chief surgeon of the Hospital of the Holy Ghost, whose name I have forgotten ; he therein discoursed of wounds of the head only, and proved, by very good reasons, that they ought to be dressed only once in three or four days, and sometimes not so often. Moreover, in dressing he did not altogether lay open the wound, but kept always upon it some thin covering, as is done at this day in many places in dressing burns.

In fine, he took such great care to hinder the air from passing into and injuring the wounds which he dressed, that we may be assured he judged it a great impediment to their cure ; which was also his opinion of frequent dressing. In the same book he deduced many examples, among which were several accounts

of very considerable cures accomplished by this method.

It were much to be desired that every one, without regarding the public censure they might incur, had the same charity to reveal the knowledge they have attained by their care and experience; for it is very probable that by the universality of mankind almost an universality of knowledge is possessed; one has a genius for one thing, and the next hath a genius for another, and each their different endowments; so that in civil life, and particularly in an art so necessary for the preservation of mankind, every one ought to communicate without any reserve.

After all, there is no rule without some exception, and I freely own that there are certain cases wherein tents ought sometimes to be used, as in wounds of the breast, and in an empyema, when we would hinder the total evacuation of the blood or matter to preserve the strength of the patient; or, in fine, on some other occasions, where they may be judged absolutely necessary.

There are other wounds to which dilaters are necessarily required, as when the bones being rotten or ulcered, we wait for their ex-foliation; or when they must be kept open in order for some further operation to be performed upon them.

There are also other wounds, to which, of necessity, we must occasion some pain, whether by drawing forth extraneous bodies, or by setting broken bones, or by dilating their orifice.

Others there are who will take up some time in dressing, as those of the head, where we often suspect there may be a fracture of the skull; also when the skull is broken, when some operation is to be performed

upon the bones, in complicated fractures, and when extraneous bodies are to be drawn out; in such cases we cannot dress so quickly as were to be wished.

To conclude, there are some that must be often looked to, as when, notwithstanding our care, the suppuration is great; also in abscesses that are cavernous and deep, in very hot seasons, and in patients of an ill disposition of body, who abound in excrementitious moisture; or when phlegmons, erysipelas, lividity, gangrenes, or any other unexpected accident ensue upon a wound; for it is the part of a prudent and skilful surgeon to accommodate himself to emergent occasions, and to correct the symptoms as they fall out."

ORIGINAL RESEARCH, EXPERIMENTAL AND INDUCTIVE.

“Dire n'est rien ; faire est tout.”—RENAN.

PHYSICAL RESEARCH ON NERVOUS MATTER.

PART II.

IN Part I. of this series I dwelt on the question of rigor mortis of cerebral matter, and on the suspension of the solidification of that matter. I also described that fresh brain matter is not a solid substance, as usually supposed, but that when the membranous portion is removed from a dead brain there is left a thick fluid substance, which at ordinary times is a pulp of a neutral character, the specific gravity of which is .865, and which forms rather more than 97 per cent. of the whole structure. I explained that this semi-fluid pulp, when it is put into a basin, falls into a curiously shaped figured surface ; that treated with water it divides into three parts ; that dried until it ceases to lose weight it yields 23 per cent. of solid matter, so that in the brain entire there is 77 per cent. of water ; that when the pulp is dried down until it has lost 44 per cent. of water it begins to burn in the flame of a lamp, burning brightly when it has lost half its water ; and that when all the water is gone it burns as brilliantly as a wax taper, without smoke, and with abundant scintilla-

tions. I dwelt upon the deflagration of the spinal cord; on the action of hydrogen peroxide on brain pulp; on the combustion of brain matter in oxygen; and on the combustion of the same substance in combination with other chemical substances.

In the present communication I propose to follow up this enquiry with some further details.

OBSERVATIONS (*continued*).

OBS. XXII. *Prolonged Admixture of Brain Pulp with Potassium Chloride*.—A specimen of brain pulp having been charged with potassium chloride rubbed up with it in the most careful manner, in the proportion of 10 parts of the salt to 90 of brain stuff, was set at rest in a temperature of 64° in a covered jar, and was allowed to remain untouched for one hundred and forty days. On the one hundred and forty-first day it was examined and found to be free of decomposition of the ordinary kind. It had divided into three distinct parts. On the upper part was a dry, thin, crystalline layer. Beneath there was a thick, firm, and rather brownish layer of condensed structure, and below that a thicker layer resembling the pulp itself in its original state—whitish, creamy, and unchanged. This substance, in mass, was tested to observe its combustion, in order to ascertain if it would burn more readily than fresh brain stuff that had not been treated by any chemical body. Until the necessary portion of water was gently evaporated by gentle heat the substance seemed to behave just as the fresh matter of the brain. Then, when the platinum crucible began to glow, showing the absence of evaporation, the brain mixture commenced to burn, not in the usual manner, with a flame, but to incinerate. At one point it did, for a short time, give a slight flame while the crucible was held in the

lamp, but the flame was extinguished immediately the crucible was withdrawn. Finally, after complete incineration, there was left a very large carbonaceous mass, which was moderately firm, but had a pitchy, almost adhesive quality, incapable, when plunged into the flame itself, of active combustion.

OBS. XXIII. *Prolonged Admixture of Brain Pulp with Potassium Nitrate*.—Another specimen of brain stuff that had been charged with 10 per cent. of potassium nitrate, and had been left, like the previous specimen, at 64° Fahr. for one hundred and forty days, was tested as in the last experiment. It too presented three parts: an upper and very thin crystalline layer; a lower and denser fleshy-like layer; and a still lower and massive portion of fluid pulp, like the lower layer of last specimen in consistency, but with the difference that it had a very faint tinge of red. When the mass was put in the platinum crucible over the flame it underwent incineration after the escape of the watery part. Once or twice there was a flame from it, but only while it was in the gas flame of the burner. It left in this manner, as in the case above, a large mass of a slightly pitchy character, but which became, when cold, solid and firm, like a dried coal cinder.

OBS. XXIV. *Prolonged Admixture of Brain Pulp with Amyl Nitrite*.—A specimen of brain pulp which had been intimately mixed with amyl nitrite in the proportion of ten parts in the thousand was allowed to remain at a temperature of 64° for one hundred and forty days. On the one hundred and forty-first day it was found free of ordinary decomposition and not separated into layers. It was a little bleached, and continued to give out the odour of the nitrite, a very minute portion of which had exuded from the mass. When the mass

was exposed in the platinum cup to the gas flame its substance for a long time resisted all change except that the nitrite volatilised from it. When that ceased, but not before, the pulp began to burn independently. It burnt brilliantly, and continued to burn, after it was removed from the gas flame, with bright scintillations, in the same way as ordinary fresh-dried brain pulp consumes. It consumed also to the fullest degree, leaving the merest film of carbon as a residue, and that in a light reticulated form.

OBS. XXV. *Action of Phosphorus, in Solution of Carbon Bi-sulphide, on Brain Pulp.*—One hundred grains of fresh brain pulp were intimately mixed with one hundred fluid grains of bi-sulphide of carbon saturated with phosphorus. The mixture was placed in a glass flask carefully stopped, and was set aside at a temperature of 64° for one hundred and forty days. During this period it was occasionally subjected to observation, and was found all through to be giving forth fumes of phosphorous acid when exposed, for a moment, to the air. On the one hundred and forty-first day the specimen was still giving off fumes of phosphorous acid, but it was not luminous in the dark on exposure to the air, even over a wide surface. It was placed in a platinum crucible, and was exposed, as in previous experiments, to the flame of the Bunsen burner. It is a curious fact that while the crucible was in the flame the fumes of bi-sulphide of carbon were burning above the crucible; in the crucible, during the first exposure to heat, phosphorus was seen burning when the crucible was removed from the flame. But, so soon as the bi-sulphide of carbon had passed off, and the phosphorus had ceased to burn, the crucible itself became red from heat, and the brain pulp began to burn, emitting

a very large flame of pure whiteness and yielding no visible smoke. It continued to burn until the smallest volume of carbon, until a very fine webwork, the size of a threepenny bit, and reticulated, remained indestructible.

BRAIN PULP BUBBLES.

OBS. XXVI. *Inflation of Brain Pulp by the Breath.*

—A portion of fresh pulp was carefully rubbed up with three times its volume of water at the ordinary temperature. It became a thin saponaceous-looking fluid, resembling much a solution of soap. The analogy of this fluid led me to ask if the brain would behave like soap under inflation from the breath. A tobacco pipe was used just as in blowing [soap bubbles. The rim of the bowl of the pipe was placed just under the fluid, and gentle inflation was made with the breath. As with soap water, small bubbles were formed freely under light pressure of the breath, and small independent bubbles could be blown so that the pipe could be lifted away with a well-defined bubble upon it the size of a large walnut. The bubble could not, however, be thrown off, or made to float in air in the same manner as a soap bubble, although as it adhered to the pipe it would probably not have been known from a soap bubble. The experiment was varied by using different quantities of water mixed with brain matter, but not with better results.

SPINAL CORD AS A DIRECT ABSORBENT.

I observed that spinal cord when dried gently down until it ceased to lose weight from desiccation, reabsorbed water on exposure to the air in the manner of seaweed, and from being brittle became flexible. This led me to ask if the cord would absorb other

fluids and carry them in the manner of a wick along its surface.

OBS. XXVII. *Test with Bi-sulphide of Carbon.*—I filled a small spirit lamp with bi-sulphide of carbon, and inserted a piece of spinal cord into it in the manner of a wick. I now covered the free end of the cord with the usual glass covering, and allowed the lamp, thus charged, to stand for twenty-four hours in order to allow the bi-sulphide to rise to the upper portion of the wick, if it would do so. At the end of the time the upper part of the cord was exposed, and a light applied to it. No combustion took place, nor did the bi-sulphide solution appear to have passed through the cord at all. The cord was now taken out of the bi-sulphide and the flame was applied to the part that had been directly in contact with the fluid. The bi-sulphide took flame and burnt off, but the cord itself did not inflame until it was so far dried down that it burnt in the usual way.

OBS. XXVIII. *Test with Alcohol.*—The same experiment was tried with alcohol in the place of bi-sulphide of carbon—that is to say, the test was whether spinal cord, desiccated, would act as a wick to a spirit lamp. The cord was kept in contact with the spirit for twenty-four hours, when an attempt was made to light the wick. The results were precisely the same as in last experiment. There had been no absorption of the alcohol through the cord, and there was no combustion set up. The cord was taken out of the spirit and exposed to flame with the effect of the alcohol burning away on the surface without any combustion of the cord itself. The experiment was tried with alcohol in other degrees of solution with water, and with similar results.

EFFECT OF ALKALINE ACTION ON BRAIN PULP.

For more than forty years past the action of alkalies on animal fluids and structures has occupied my attention with results which have been most varied in character. There is, indeed, nothing more singular in physiology than the different kinds of action produced by alkalies in combination with, more or less, of water. Thus I find that while some alkaline solutions tend to hold albuminous solutions or proteids in the fluid state, other solutions, even of the same alkali, produce the very opposite condition, namely, gelatinisation and solidification. For example, the fluid albumen of egg in a feeble solution of hydrate of soda is rendered more watery, forming a distinct fluid with the water; but dropped into a concentrate solution of the same hydrate it will undergo a transformation into a gelatinous mass, a large drop of it taking the rounded form and presenting a substance not at all unlike to the crystalline lens of the eyeball. The same phenomenon can be extended to the blood, a weak solution holding the blood fluid so that it will not coagulate, a sufficient concentrate solution producing an instant coagulation. Ammonia, to a certain extent, produces the same results, with this remarkable difference, that those fluids which spontaneously coagulate can be held almost indefinitely in a state of solution when mixed with a proper proportion of ammonia, but will immediately coagulate when the ammonia is volatilized. Thus a specimen of freshly drawn blood which I preserved by the addition of ammonia for twenty-two years underwent coagulation when the ammonia was removed.

I thought it therefore a very useful labour to enquire what the effect ammonia and other alkalies would be on fresh brain pulp. I was conscious that the antiseptic

power of the substance would prevent decomposition of brain matter, but in what way would it affect its quality? Applied to a muscle like the heart, the tendency of ammonia is to preserve the structure by preventing ordinary decomposition, but also to cause, after a long exposure, a gelatinous transformation which extends through the muscle, and causes a variation of a structural nature. On lung structure it leads to a different change, a peculiar bleaching, with a saponaceous development. On the crystalline lens it acts so as to produce a softness for a little time, then a dense opacity, and so on through various changes, according to the texture exposed to its influence.

OBS. XXV. *Action of Ammonia in solution on Brain Pulp.*—One thousand grains of fresh brain pulp were treated with one hundred grains of strong liquid ammonia of sp. gr. 880. The two fluids were intimately mixed, and a thinner liquid than the brain pulp itself was at first produced. The mixture was placed in a covered jar and left in a temperature of 64° Farh. for twenty-four hours. At the end of that time the whole mass was found as if gelatinised. It was moulded to the jar, and could be turned out in the moulded form. It was now exposed to very gentle heat over the water bath to see if, like gelatine, it could be redissolved. The temperature was slowly raised to 140°, when, instead of dissolving, it underwent a more determinate solidification, with the formation over its whole surface of a firm membranous-like coat or covering, which could easily be peeled off, disclosing a tinted reddish structure, of a fine fibrous appearance, within, which cut almost solidly, like fleshy material. The whole was insoluble in water.

COTEMPORARY PRACTICE AND LITERATURE.

"Every physician will and ought to make observations from his own experience ; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."—FREIND.

EPIDEMICS IN BRITAIN.

 HERE can be no hesitation whatever in assigning the first place, and, indeed, the first place of the whole year 1894, to the second volume of Dr. Charles Creighton's History of Epidemics *Epidemics in Britain*: (Cambridge University Press, 1894). The first and second volumes of Dr. Creighton's work form a library of themselves on matters bearing upon epidemics, and if those who are at the present time writing so much on the smallest knowledge respecting epidemics would devote themselves to far more useful work than their own hasty and imperfect chronicling, and would study the volumes before us, much greater progress in knowledge, and much sounder practice, would be developed amongst us. In this volume the author brings before us the epidemics that have affected England since the year 1661. He describes the epidemic fever of that year after Willis; gives an account of typhus fever as prevalent in London; introduces the sanitary condition of London under George II.; the window-tax and its effects; the jail fever; ship fever; fever and dysentery of campaigns; the putrid condition of fevers in the middle third of the eighteenth century; the comparative

immunity from fevers during the war and high prices of provisions, 1803-5; the typhoid or enteric fever in London in 1826; enteric fever mixed with prevailing typhus; the Irish fever of 1847; fever and dysentery in Ireland; influenzas and epidemic agues; smallpox, measles, whooping-cough; scarlatina, and diphtheria; infantile diarrhœa; cholera nostras and dysentery; and Asiatic cholera; with a note on cerebro-spinal fever. If the volume were not remarkable altogether, it would be sufficiently so from the pains the author has taken in treating on the subject of smallpox, and the very delicate part, on that subject, the effects of vaccination. On these topics, as most know, Dr. Creighton boldly expresses views which are considered by many as peculiar, and his account, first of inoculation for smallpox, and afterwards for cowpox, while it startles many people, deserves the most serious consideration. In point of fact, the history of inoculation and vaccination is imperfectly understood until all the facts which are here gathered together are clearly in the mind. On the question of smallpox, he holds that between an epidemic of one kind and an epidemic of another there is a relationship which renders all estimate of the effects of a particular and assumed special measure, which may be taken to counteract the special malady, of most doubtful value. Bearing on this great and unsolved question there is a remarkable passage or two on pages 627-8, which deserve to be introduced in their entirety.

“Just as smallpox, in its first great outbursts in the London of the Stuarts, or in its rare outbreaks in the American colonies in the eighteenth century fell impartially upon children and adults, so in its last outbursts in the London of Victoria it fell upon persons

at all ages. The notable thing is, not that smallpox should have of late been attacking adults, for that it has ever done except in times and places in which there were few or no adults who had not been through the disease in childhood; but that it should have ceased to so large an extent to attack infants and children. It has ceased to attack infants and children because other infective and non-infective diseases, more appropriate to the modern conditions of the population, are attacking them instead. These are measles and whooping-cough, scarlatina and diphtheria, infantile diarrhoea, and the more chronic after-effects of these. The annual death-rate from all diseases under the age of five has fluctuated somewhat per million living from 1837 to the present time, but it can hardly be said that it has fallen much or steadily.

“ Keeping to the epidemic of 1871-72, let us consider whether there was any natural or epidemiological reason for its cutting off a smaller ratio of infants and children in its whole mortality than that of 1837-40 did. There had been a most disastrous epidemic of scarlatina for three years just before, which had caused 21,912 deaths in 1868, 27,641 in 1869, and 32,543 in 1870, a total of 82,096 in three years, about two-thirds of which were under the age of five, or at the age-period in which small-pox used to be fatal almost exclusively, and to be the greatest single epidemic scourge of. Even in the two small-pox years themselves, the scarlatinal deaths were 18,567 and 11,922, of which the share that fell to children under five was one and a-half times the deaths in that age-period from the co-existing smallpox. The three years of excessive scarlatina, before the epidemic of small-pox began, had removed large numbers of the class of infants and children who succumb to any

infectious disease ; if we cannot give the whole *rationale* of one infection dispossessing or anticipating another, we can, at least, understand that the earlier and more dominant infection takes off the likely subjects. What scarlatina did egregiously during the three years just before the great explosion of smallpox, it had been doing steadily (along with measles, etc.) throughout a whole generation since the last great sacrifice of infants and children by smallpox in 1837-40. But the fact that scarlatina had in great part dispossessed smallpox among the factors of mortality under the age of five did not prevent the latter infection from attacking those of the higher ages who were susceptible of it, and were at the same time unvexed by any other great epidemic malady proper to their time of life. If the epidemic of smallpox in 1871-72 had cut off as large a ratio under the age of five years as its immediate predecessor in 1837-40 did, its whole mortality would have been about 70,000 more than it actually was. But in no state of the population or of the public health can we suppose that three years of excessive mortality of children by one kind of contagion would be followed immediately by two years of equally special mortality at the same ages by contagion of another kind. It is not only epidemiological science that tells us this, but also common sense—*est modus in rebus*."

The view expressed above by Dr. Creighton has been similarly expressed in a general manner by less accurate writers in order to meet what they consider to have been an exposition of a difficulty many times raised in medical contentions. But it has never before happened that a man of the same quality, of the same acuteness of intellect, and, it may be added, of the same learning, has advanced an argument that goes to the very founda-

tions of epidemiological science. If the volume in hand had contained no other subject for serious contemplation and determination than the one question involved in what has been quoted, a singular and distinct gain would have been added to philosophical medicine.

ACCIDENTS UNDER ANÆSTHETICS.

THE year 1894 has been made memorable in the United Kingdom by the number of deaths that have occurred to persons of different ages and sexes under the influence of chloroform and other anæsthetics. I do not remember any year in which the same mortality has been approached. In January there were five fatal cases; in February four; in March five; in April six; in May four; in June seven; in July two; in August eleven; in September five; in October four; in November five; and in December two; sixty in all. Ten were from mixtures, two from ether, one from nitrous oxide gas, and forty-seven from chloroform.

The mortality here recorded has relation only to what has occurred in this country, and is of an import which, in the first days of anæsthesia, would have been quite sufficient to destroy confidence in anæsthetics altogether. We have, as it were, now become accustomed to a mortality of twenty-five to thirty per annum, and it is not until we reach such a high figure as above named that we begin to reconsider, in all solemnity, the question of anæsthetic death. In 1864 I devoted much time to the collection of facts bearing upon the rate of mortality from chloroform and other

anæsthetics. I passed from one hospital to another collecting the evidence that lay before me, and I came to the conclusion that the rate of death under chloroform stood at one in 2500 cases. There was considerable difficulty in arriving at correct data, for the simple reason that certain hospitals showed a high mortality at particular periods, others a low or altogether absent mortality; but from 17,000 carefully considered cases the rate expressed of one in 2500 was a fair deduction which most writers have adopted since, and which has become by a kind of general assent the standard figure. Dr. E. Andrews, following me in the year 1870, and drawing his deductions from statistics of 209,893 cases, arrived at pretty nearly the same conclusion. He gave the deaths from chloroform as one in 2723, and he reckoned the deaths from other anæsthetics, as one death in 23,204 administrations from ether; one in 5588 from mixed chloroform and ether; one in 7000 from bichloride of methylene, and from nitrous oxide not one in 75,000. The position is very considerably changed now, particularly in respect to chloroform, for in the sixty cases of death from anæsthetics during the present year, forty-seven were purely from chloroform; one purely from ether; eight from ether and chloroform; three from a mixture of alcohol, chloroform, and ether, and one from nitrous oxide. Of the fatal cases of all kinds, thirty-six were males; twenty-three females; one an infant. Twenty died before operation; thirty during operation, ten directly afterwards. There was no death from methylene.

As we have no correct figures showing the number of operations that take place in a year in Great Britain and Ireland, nor of the administrations of anæsthetics in that same period, we cannot arrive at a true

percentage of deaths from anæsthesia; but Snow in his day was of opinion that there were not more than five cases of deaths from anæsthetics during the year. I have in my possession a catalogue of all the instances in which Snow himself induced anæsthesia in the human subject. They amount to 4285, and in them he had not a single death under chloroform. The only deaths of an anæsthetic character which occurred in his practice were two from amylene. Snow administered chloroform from the year 1847, until 1858; so that actually he administered it, on an average, at least once every day for over ten years without a mishap, a result which would certainly mean a very different state of things than is now presented. The grand question is whether there was anything peculiar in his method of administration which led to so good a return. Comparisons are always odious, and yet I cannot but think that there was something in his method which gave rise to so striking a success. This idea is very much strengthened by the circumstance that his mode of administration differed in the most marked manner from the mode which has been more recently adopted. Snow was always what may be called a cautious administrator. He had arrived at the conclusion, from direct experiment, that the introduction into the living body of eighteen minims of chloroform was sufficient to produce the deepest anæsthesia required for any ordinary operation, and his endeavours were directed so to reduce the amount of chloroform in inhalation that not more than eighteen minims could ever be diffused at once into the blood. He was also very particular in watching the effects of the chloroform on the circulation; so particular that on more than one occasion he asked me to go with him to patients about whom he

was very anxious, in order that I might, with a flexible stethoscope, report on the action of the heart during the period of inhalation. If I reported that the heart was becoming irregular in its action, or was undergoing any very marked change, he invariably stopped inhalation, and, I think, always with marked benefit. He also would never give more chloroform than was absolutely required, and I recollect well a sharp altercation between himself and the late Sir William Lawrence, because Sir William wished to have the chloroform repeated on a recovering patient, whilst three or four stitches were to be inserted into the wound. Snow, who held that a prick from a needle was less dangerous than a repetition of the chloroform, would not renew administration, and I feel satisfied he was correct in his cautious action. To be quite secure he invented "a balloon," afterwards transformed by Clover into a bag (Clovers' bag), in which chloroform to the extent of 5 per cent. combined with air was employed. After a time Snow invented his well-known inhaler, in which he considered the dilution of the chloroform was effected, and round which he placed a metal jacket that would hold water of varying temperatures according to the seasons. It was this inhaler, with double-valved mouth-piece, which he used so many times, and on his death it came into my possession with his practice, and was used by me on his method about 1250 times without a catastrophe. It was replaced by what is called Dr. Junker's inhaler, an instrument which has been greatly improved in detail by Messrs. Khroné and Sesemann. This inhaler carries out the intention ingeniously, administrations are so gradual and measured in their character, they do not, if I may use the expression, flood the patient with chloroform. My

experience is that the correct way of administration of chloroform is to give the vapour thus properly diluted, and that the theory of pushing the vapour so as to get a rapid anæsthesia at all risks is as dangerous a plan as could possibly be devised; I can but look upon the excessive mortality which has followed administration as largely due to what must truly be considered a practice rough, ready, and venturesome.

"ANNUAL OF THE UNIVERSAL SCIENCES, 1894."

DR. SAJOUS brings out once more his "Annual of the Universal Sciences," or yearly report of the progress of the general sanitary sciences throughout the world." (F. A. Davis and Co., New York; F. J. Rebman, London.) As before, he is assisted by seventy associated editors with two hundred corresponding editors and collaborateurs. Every year it is a pleasing duty to notice this remarkable work, which, hitherto, has had no parallel, and which is not likely, in our generation, to find any important rival. The volumes are five in number, and the general index by Drs. D. Braden Kyle, of Philadelphia, and Messrs. Eugene Devereux, A.M., and N. I. Devereux, of Paris, is of itself a most curious study, extending over sixty closely printed pages. Such is the care taken by each editor in his department that the whole of the medical science for the year is introduced; and, as the basis of the information, the reference list of journals from which the information is derived becomes itself a kind of "index medicus" for the year, the value of which is historical. It is not until one takes up a list of references such as is recorded in these

pages that it is possible to imagine the enormous amount of literature on subjects relating to medicine that is from week to week, month to month, quarter to quarter, and year to year brought into the world. The list itself would form a good subject for a long review, and even then the separate books published as volumes would only, to a small extent, be included. I am inclined to urge once more that one of the most urgent wants for the profession is a supplementary volume of each yearly series, in which the really valuable parts of this vast set of compilations shall be culled out and put forth in an agreeable, and at the same time practical, form. It is quite right, in a valuable work of compilation, to epitomise everything without individual criticism, as is done in the exhaustive and admirable manner of these five yearly volumes; and when any writer is preparing a new essay on some individual subject nothing can be more fortunate for him than to get at once from out of them sure reference to every paper that may have been for some years past written on the particular subject. It is also of great value to the busy practitioner when he is specially concerned in any case under his care to be able, at once, to refer to all that has been recently written on that kind of case—its physiology, its therapeutics, and its pathology; in the mind of the whole medical world as it is reflected in these pages. It is impossible to over-estimate the value, both for writer and practitioner, of instant contact with such references, yet some will still say of the work :

“ Fie on’t ! fie on’t ! ’tis an unweeded garden ” ;

and there may be truth in the saying, luxuriant fruit and forest trees being intermingled with tares and

thistles. What, therefore, is wanted, is a philosophical abridgement derived from the whole, in which what is choicest as bearing upon the progress of medicine for a year's entirety, shall be, by some literary gardener who knows his business, brought within easy compass, and be authoritative in relation to all the true and useful advancements in the science and practice of the healing art.

CONCULCATION VERSUS INOCULATION.



SMALL treatise on the prevention of small-pox, by Professor Edgar M. Crookshank (H. K. Lewis), affords a good illustration of the relative values of conculation, or stamping out of disease, and inoculation, or stamping in. These two opposing principles are, at this time, the two elements of contention in medicine, inoculation being largely an orthodox fashion on the medical side, a fashion gained, firstly, from inoculation of small-pox for the prevention of small-pox: and, secondly, from the inoculation of vaccine-pox for the same object. Professor Crookshank, opposed to the stamping-in school, must be prepared to accept all the consequences of opposition to prevailing fashion. He need not trouble himself on the subject, nor sleep one moment short; for fashions differ from truths, in that they are mutable; are here to-day, gone to-morrow; sworn to, sworn at, and then as fashionably forgotten. He claims that a man who will resolutely stamp out a disease is above an inoculator of disease; as much above as is one who picks up an explosive shell and casts it into the sea, or stamps out its fuse, over another who would try to introduce some new chemical into the shell that would

neutralise or modify the action of the explosive contained in it.

The great point urged by Professor Crookshank (a point I and other sanitarians have also insisted upon) is that if the stampers-in could succeed they would not really help sanitation, but by their bungling production of so-called cure, on the principle of setting a thief to catch a thief, they would render the apathy of the world more apathetic than ever in regard to principles of prevention ; as, who should care about prevention when to be afflicted is only to be cured of the affliction ? He says we want prevention by stamping out disease, not cure of one disease by stamping in another ; in which he is perfectly right, for now and for good. If all men and women would, under medical direction, join in stamping out disease instead of stamping it in, all disease that can be abolished would be abolished in a generation ; but we must wait until wisdom in physic squares, planes, and fits to its shape the conceited thing it calls knowledge, before there can be any true advance. It is the simplest logic that he who pretends to heal must never wound to cure, nor kill to save.

Stamping out, conculecation as I have named the process, could admit of being tested on oath, with punishment for perjury behind the trial. Who would venture to swear that inoculation always prevents, or cures, or is free of danger ? The assured evidence on which the latest craze of it rests would not pass through a court of the first instance in law. But courageous men who, like our author, dare to express themselves, and, as Goodsir used to say, "speak the truth, the whole truth, and nothing but the truth," are rare indeed.

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2nd
Quarter,



1894-5.



*CYCLING AND HEART DISEASE.**

IN Paris, a few months ago, Dr. Petit read a paper at the Academy on Cycling and Heart Disease, with some comments on cycling generally, which attracted much attention from the medical world there. Cycling commenced early in France, and was followed by many medical men. Indeed, the first cycle I saw at work, in the year 1868, was in Normandy, its rider being a medical practitioner who made his journeys on his machine, a fairly good bicycle for that day. But the general use of bicycles and the introduction of tricycles passed most largely into this essentially mechanical country of England, where the art of cycling has made, in a single generation, a progress which in some senses competes with the railway system itself, and which is destined to be one of the forces of the world. Under the initiation of some cyclists in France, a remarkable following, of young men especially, has recently been developed, so that the streets of Paris, like those of London, are filled with swift and skilful riders. Petit asserted that there might be one hundred thousand riders in Paris

* Paper—revised—read before the Medical Society of London on January 13th, 1895, Sir William Dalby, President, in the chair.

alone, amongst whom there must of necessity, he thought, be some, perhaps one per cent., who were suffering from heart disease. He himself had met with three cases in which persons who were riders had suffered fatal consequences.

The subject thus started has created a marked impression in this country, and from members of the profession of medicine several questions have been sent to me inquiring whether danger of heart disease from cycling is to be expected or seriously dreaded.

I have been a cyclist since 1877; have ridden with numberless riders of different ages and sexes at all seasons of the year, on roads and gradients of the most varied kind, and often for long distances. It has also been my privilege to have presided for ten years over a society of scientific cyclists, and to have heard there the opinions of the best of the fraternity on the many subjects connected with the work. I venture therefore to speak, with some original knowledge, to this strictly medical audience, on the subject of a pastime and exercise which has become national, and regarding the effects of which the medical community ought, of all others, to be most interested.

There is what may be called a physiology, a pathology, and a practice derivable from observations on cycling, in the study of which many parts and functions of the body are concerned; but inasmuch as the effects of cycling on the heart have been the first of moment brought under observation, and as this one subject is large enough for even a series of papers, I shall confine myself to three points:—

(1) The immediate effects of the exercise on the heart and circulation as observed on the rider.

(2) The after effects as observed in the consulting

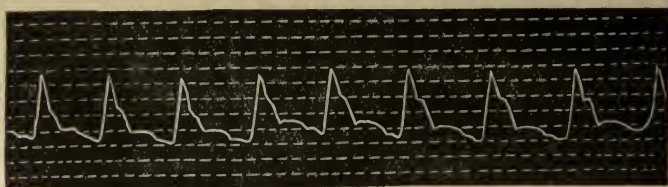
room or sick chamber, with the conditions, in regard to the circulation and the heart, in which riding is favourable or unfavourable.

(3) A summary of the more salient and practical considerations of a purely medical character.

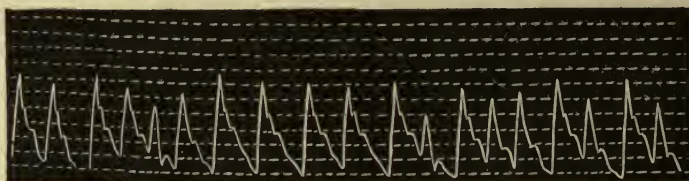
I. IMMEDIATE EFFECTS ON RIDERS.

The exercise of cycling has an effect upon the body at large, but it is upon the heart and circulation that it tells primarily and distinctively. In this it differs from many other exercises. Rowing tells on the breathing organs; the work of dumb-bells, and of other exercises where muscles are moved without progression of the body, tells most on the muscles themselves; and long pedestrian feats, with climbing, tell on the nervous system. In cycling, as in running, it is the heart and circulation that first give demonstrative evidence of important change of action. In all riders at all ages, in riders who are practised in the art, as well as in riders who are neither practised nor extreme in the work, there is, in the beginning of each attempt, a quickened circulation, although there may be no consciousness of the phenomenon. The pulse at the same time is full and bounding, and there is the further fact that throughout the ride there is a continued rapidity, not amounting to the same degree as at first, but, if the pace be even moderate, rarely falling under the hundred pulsations per minute. In men advanced in life the increase, relatively, is observed as in younger men, a circumstance that tallies with the rise of the senile pulse normally, as if senility were indeed a part of the second childhood. The rise of the pulse is considerably increased in the act of climbing ascents, with a fall on horizontal planes,

and well-marked fall in descents, especially if the feet be taken off the pedals, as is the practice of accomplished cyclists. The strokes may come down to their natural number if the descent be very long, and if there be no disturbing act that interferes with the cardiac motion, such as jerkings from a rough road, an interference by no means infrequent, and always detrimental to the rider, especially if he or she be of what is called nervous temperament.



PRELIMINARY STAGE.

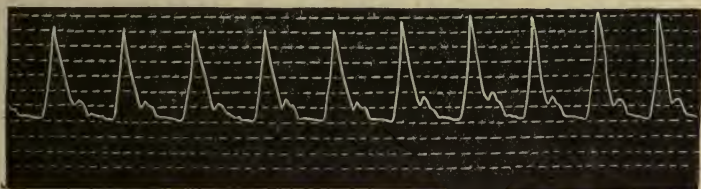


RAPID STAGE.

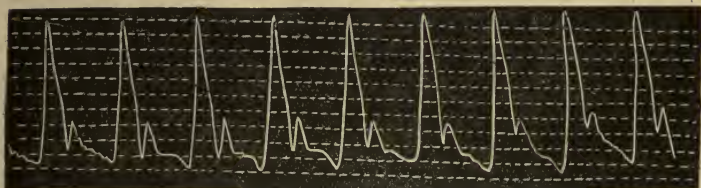
While the pulse is increased in action, the heart, if examined during a few moments of rest in order to permit of auscultatory examination, is found to be of full bound like the pulse. The external impulse is very pronounced, and the sounds of the heart are full and determinate, with, not infrequently, an accentuation of the second sound. The dulness of the cardiac region is also extended, indicating that the cavities of the heart are at their fullest distension.

I do not think the practice of cycling, though it

be daily continued, leads to steadiness or quietness of pulse. I have noticed that regular riders, as well as occasional, have quickened pulsation during the exercise. To some extent there is diminution in rate of rapidity, but there is never an actual return, at the time of movement, to the natural standard. It is often observable that the pulse-reading takes a distinct form on the sphygmograph. The impulse stroke is



PROLONGED CYCLING STAGE.



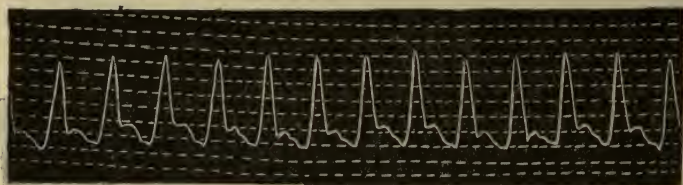
AN ALCOHOLIC PULSE.

lengthened; the recoil is longer and the angle is sharper than is normal; the third event from closure of the aortic valves is usually sharply marked, and, as is necessary owing to the rapidity, the strokes are near together.

After a time the character of the stroke as a whole is very much like that produced by alcohol, as the readings above, the first showing a cycling pulse, and the second an alcoholic pulse, indicate. There is, however, this difference between the alcoholic stroke and the cycling—the alcoholic is not maintained for a long period. As the influence of the alcohol passes off, and

the body begins to cool, the pulse begins to fall and occasionally to intermit, so that more alcohol, as a stimulant, is called for owing to the central failure of the circulation.

In cycling, so long as the exercise can be continued, an increase of cardiac motion is observable, the act of movement on the machine seeming sufficient to keep the circulation in its vigorous and now more equal tension. This accounts, I conceive, for the astounding journeys which the fully trained cyclist can undertake, when he is in his prime. The same accounts, I suppose, for his endurance against sleep; the circulation through the



STEADY CYCLING PULSE.

brain being one continued series of waves by which the molecular repose occurring during natural sleep is suspended.

According to my experience, no rider on a cycle escapes the quickened motion of the heart, and Kolb, whose admirable work on the "Physiology of Sport" betrays, at once, a truly observant and unbiassed judgment, comes to the same conclusion. The statement, as a matter of fact, is sufficient of itself to cause a degree of alarm to those who have not studied the question practically; yet, strange as it is, it is only fair to say that the mischief which follows the overaction does not, at the moment, lead to the appearance of any such amount of danger as might, *a priori*, be

expected. I have never in my life known any rider so embarrassed by cardiac over-action as to cause him to feel it necessary abruptly to stop in order to dismount and seek rest. I have seen riders dismount from their machines in ascents because of the difficulty of propulsion, and I have occasionally seen one who has complained of slight breathlessness, which soon has passed away; but I have never known one grow giddy or describe symptoms of angina or other indications of cardiac embarrassment. Indeed, there are some very peculiar facts bearing on the point, which are quite clear as facts though difficult to account for. For example, I knew a good and practised rider who, on his machine, could climb a hill I could not attempt, and who did not feel, on his part, anything peculiar; but this same rider, if he were asked to mount a flight of stairs on foot, such as the stairs of the Monument, would become almost incapable of doing the same after he had ascended a very short distance; would have to rest many times in the ascent; and would complain both of breathlessness and palpitation. We might be inclined to say, therefore, that cycling, though it increases the rate of the circulation so rapidly, is not injurious. There, however, I think we should be wrong, because there has not been length of time enough to determine from many cases what the ultimate effect of long continued and hard riding may be. The evidence on this particular subject is unfavourable at a general glance, for it must be admitted that several accomplished and skilful riders have, after some years, succumbed prematurely from diseases of the circulation; but there has been no sufficient pathological inquiry to prove in what way the damage was developed.

II. AFTER EFFECTS AS OBSERVED IN THE CONSULTING ROOM OR SICK CHAMBER.

The modification in the motion of the heart which has now been noticed, the rapidity which, I believe, is universal amongst riders, leads to the question of the after effects of riding by those who have already some disease of the heart or great blood vessels, such effects as we may witness in the consulting room or sick chamber. Dr. Petit suggests that out of one hundred riders of mixed ages there is sure to be one at least who is affected with heart disease, and it is only fair to admit that his calculation is extremely modest. The wonder, therefore, is why so few suffer in an immediate manner from the exercise. He seems to have known of two or three sudden deaths from cycling, but he does not tell us how many hundreds of thousands of persons form the body of riders out of which this conclusion was drawn. For my own part, since the year 1877, during which time my mind has been from week to week directed to records of cycling and cyclists, I can only calculate from five to six instances, physical accidents excluded, in which a cyclist is said to have died during the exercise, and I am not sure that in any of these cases the fatal condition was induced by the influence of the exercise upon the circulatory system of the blood, or upon the heart. It is just to say there may have been sudden deaths in this country during cycling, but it is quite unjust to affirm that all who have died thus suddenly have succumbed from heart disease, inasmuch as many of the catastrophes have occurred from direct lesion, over which the rider had no control and which might have happened in any swift mode of motion.

The scene changes when we have to consider continued effect for some years, on those in whom the elastic tissues have lost much of their primal elasticity. It is certain that there are many men and women in whom the circulation becomes disturbed, and, if I may so express myself, distained, by an arduous pursuit of the exercise; but fortunately there comes with this a saving distaste for the exercise, which gives protection. You ask one who has been a cyclist why he has given up the cycle, of which, perhaps, he was once an enthusiastic supporter. He tells you that he has nothing to say against it, but for some obscure reason he has not felt inclined to keep it up, and that he has not ridden for many weeks or months. You look a little deeper in instances of this kind, and you detect that there is some feebleness of the circulation; that there is coldness of the extremities, an unnatural languor and inability to sustain fatigue, and a rather quick weariness, if exercise be tried on the machine. I have known a man who would think nothing at one time of riding to Barnet and back (twenty miles), would feel indeed what he called invigorated, who, after some ten years of the work, would be wearied at riding twice round the Regent's Park (or four miles). This change of condition goes as by a kind of rule, but it admits of many and striking exceptions. I recall one example in which a gentleman who as an enthusiastic rider kept up the practice for a great many years, after he was an octogenarian was so little influenced by the exercise, except for good, that he rode one day from London to Bedford (fifty miles), and experienced little more fatigue than the youngest of his companions.

Reviewing then the effect of cycling upon the heart, while it must be admitted that as a stimulant it tells

upon the heart in the most striking manner, quickens the circulation, and causes a rapid flow or flush of blood through the tissues of the body, it is the remote rather than the immediate effect, central and peripheral, that is injurious. Hence the reason why so many thousands of cyclists carry the exercise to an extreme degree, and are so rarely subjected to early fatal consequences. The experience is gratifying. At the same time it does not remove a second line of experience—namely, the truth that long persistent stimulation from riding induces changes which lead to a gradual deterioration, due probably to degeneration of the elastic tissue and incompetency of that tissue to fulfil its little appreciated, but all important, functions in the body at large.

At the conclusion I will state a few general propositions in respect to the best medical advice that can be given to cyclists; but, at this moment, I will take into consideration the important question whether there are conditions of the heart and circulation in which the exercise requires to be specially regulated or forbidden. I quite agree with Dr. Petit that one per cent. of persons who ride the cycle are likely to be suffering at the time from some irregularity of the heart-beat, or from some form of valvular or vascular disease; and yet there stares us in the face the patent fact that thousands of persons of different ages are cycling, and are not becoming, to their own consciousness, victims of the exercise. Nothing has surprised me so much as the immunity of cyclists who are actually suffering from symptoms of cardiac disorder. I am perhaps making what may be thought to be a strange statement, and yet I am perfectly sure it is a true statement, when I say that there are marked

conditions, strongly objective conditions, of diseases of the circulation in which, though danger might be expected, benefit has arisen from the exercise. Let me name some of these.

Varicose Veins.—When cycling first became fashionable there was great fear that a varicose state of the veins was likely to prove an objection to cycling. A member of our own profession consulted me on this point. He was devoted to the exercise, but was affected with extreme enlargement of the veins in the lower limbs, the varicose enlargement extending into the thighs. He had for many years worn an elastic stocking, and it seemed to him impossible that he could, with safety, continue to cycle; and yet, he added, "I have ridden for six months, and I must say that, if anything, the veins have decreased in size, while no unpleasant symptom has resulted." I advised that he should continue, in moderation, to use the cycle; that he should carefully watch the effects, and that he should permit me now and then to make a careful examination and measurement. The exercise was carried out, and, it is proper to say, with very good results. A cure certainly was not effected, but the veins distinctly decreased in size, and he has continued without any new occasion for anxiety. One further observation he also made—namely, that if from any circumstance he ceased to cycle for some days, and was confined to sedentary work, an increase in the size of the veins always followed, an increase that passed away when the exercise was resumed. These good effects were produced, I doubt not, by the difference in the rapidity of the circulation. Under cycling the rate of the arterial circulation was increased; the course of blood through the capillaries was quickened, and the column

of blood through the passive veins flowed with greater ease and regularity. The passage of blood through the portal system would also be accelerated, as the function of the liver was more actively carried on, a function the activity of which is certainly improved by cycling.

The phenomena presented in the case just described led me to make further inquiries amongst other riders, and as varicosity of the veins is by no means an uncommon phenomenon, I have been able to collect what I think leads to a conclusive detail. I am satisfied, because I have never seen an opposing fact, that cycling does not increase the varicose condition, and that sometimes it causes a decrease of it, although never an actual cure. I have twice seen an accident in this class of cases when, from getting off too hastily from a machine, the limb has been struck, a distended vein has been injured, and a profuse ecchymosis has followed; but such an accident is of course merely contingent, and suggests that persons with varicose veins ought to exercise greater care than those who are more fortunately placed.

Fatty Degeneration.—I have several times had occasion to see cycling carried out where there has been good reason to expect fatty degeneration of the heart. A typical case will present itself as follows:—A person of middle age will have been engaged in some sedentary pursuit which has prevented the due exercise of the body, and has induced that kind of physical feebleness and lethargy, desk or office lethargy, which we all so fully understand. The body is too heavy; the secretions are sluggish; the face is pale; the mind is at one time dull, at another time irritable; a small portion of pedestrian exercise wearies the lower limbs, which have not sufficient strength to carry the body any distance;

the circulation is feeble ; there is digestive indifference, and there are occasional pains flying across the chest and extending down the arms, with slight difficulties of respiration. When the heart is examined it is found to be enfeebled. It is as if it were too small for the body, and the sounds attendant on the tension of the valves are obscure ; or the second sound may be slightly accentuated, and there may be just a trace of intermittency. The symptoms give alarm, and cycling may seem a dangerous or hazardous mode of exercise in the face of phenomena which suggest an early stage of cardiac degenerative change. A few short cycle rides are tried, and it is found that they bring a relief that seems almost sovereign in its efficacy. The skin acts freely ; the kidneys throw off a full amount of urine, often accompanied with a copious lithate deposit ; the liver acts better ; the mind is relieved, as if a cloud of oppression were lifted from it ; mental work is more vigorously conducted, and the advantage of the exercise is extolled.

The question now brought before the physician, whether it is safe to whip on a circulation and a heart which has become so enfeebled, is answered by practice affirmatively. It seems at first hazardous to force the heart to increased efforts, but practice shows that danger is virtually nil, and that if cycling exercise be carried out with moderation, not every day, but two or three times a week, if it be done without strain, as from hill-climbing, and if it be not too long continued at the same stretch, it proves, as a rule, an actual remedy.

Of the facts above stated I have had the opportunity of seeing some of the most singular illustrations, of which one is a sufficient example. A patient who, in early life, had worked with great assiduity at a

sedentary occupation turned, as he called it, "a corner," and began to amass money. He continued to be successful, and still working on lived to his fiftieth year, when, having gained a large fortune, he determined to retire from business, occupy a small mansion, and "enjoy the remainder of his days." As not uncommonly happens to such persons, he, although a man of sound constitution and good heredity, fell gradually into a kind of physical and mental inertia. The leisure he had longed for became irksome, he grew unduly fat; he grew anæmic. For a time he tried to work in his garden, but that was insufficient, and indeed at last, after being on his legs for some hour or two, he felt it necessary to return to the house to find rest in the recumbent posture, and very often in luxurious sleep. In the course of a few months he became so easily tired, on exercise, that he could not walk half a mile; he was extremely nervous when any vehicle crossed his path, had occasional slight attacks of a gouty character, and extreme depression of mind. Various medical formulas and changes of diet were adopted in his case, but there was no improvement. His pulse became extremely weak, his heart's action so feeble that, the chest being large, it was really difficult to make out the heart's sounds, and all the symptoms suggested the idea of fatty degeneration of the heart. He seemed to be the most unlikely subject in the world to be benefited by cycling at the period when these symptoms were present, a period when the tricycle was just coming into fashion. I ventured, nevertheless, from the useful experience I had then acquired, to recommend the exercise, of course in the most cautious and guarded manner. The exercise was commenced under proper training, and it astonished me

to observe that in two or three days this gentleman could do his three miles on a level road, not only without discomfort, but with actual pleasure to himself, and with the sensation that he was much relieved by it, and better for it. Soon he took the reins in his own hands, and at the end of six weeks rode, one day, fifteen miles, without the least fatigue, in every sense a healthier man. He soon became a very good rider; found pleasure in the work; did not hesitate to take his thirty-five to forty miles a day; sat gracefully on his machine, and was as good a climber as I have ever seen. He lost two stone in weight, greatly to his advantage; got into thorough good health; kept up moderate riding, and to this day remains a splendid specimen of the value of the effort. It is worth while to observe that the effect of the exercise on the heart of this gentleman was from the first satisfactory. The motion of the organ was increased with advantage as to strength, so that the sounds became completely normal, and the current of the blood through the tissues was improved.

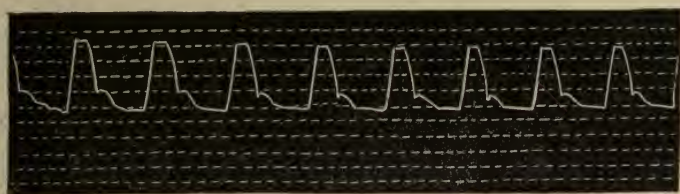
Senile Failure.—I had before me another example, in which failure of the circulation appeared to be dependent on decrepitude from age, and in which cycling seemed to be equally useful. The patient in this instance was a man of over seventy-five years, who was, as is commonly said, breaking up. He was getting somewhat emaciated, was easily subjected to colds, bore the effects of cold indifferently, was able to take but little exercise, sought the fire and warm places, and was tempted to carry an extreme weight of clothing. He complained that his feet were very cold at night, and that he could not sleep until he got warm. While at a sea-side place he commenced cycling

exercise, for a temporary change, in accordance with advice which I had very cautiously given to him. He was at first a nervous rider, but by-and-by, as he gained experience, he met the little difficulties one by one, and rode creditably. He wrote me one day to tell me how well he was getting on, and that, using my own language, he had become so master of his machine it was to him something like a part of himself. There could be no doubt that he improved in every way, that his enfeebled heart grew stronger, that his breathing was much more free, that he was generally warmer throughout his body, that he was less susceptible to cold, that his appetite improved, and that, to a considerable extent, he had renewed his life. Added to that his life became much lighter in a mental point of view. He visited me two years ago, and, for his age, was one of the halest specimens one could wish to meet. He had continued his exercise in a moderate degree, and, as far as I know, he still lives.

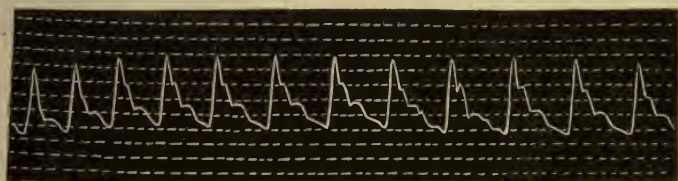
I am forced to consider that in both these cases the exercise added a considerable term of life, and I do not know that any other exercise could have taken its place in the same desirable manner. Horse exercise, by the acts of mounting, by the vibration communicated to the body of the horseman, by the varied movements of the animal in the walk, the trot, the canter, and the gallop, by the up and down motions on the saddle, and by the nervousness of being carried along in a course not altogether under the absolute control of the rider,—horse exercise is not in the least degree comparable with cycling in these cases. Walking, in any degree, is all but impossible, because the limbs have to carry the weight of the trunk, and fatigue, which is

very wearing, leads to more exhaustion than is balanced by the exercise.

Gouty Dyspepsia.—Gouty dyspepsia, in which there is comparative free use of the limbs, is often much benefited by moderate cycling. The pulse-tracing in these cases is often characteristic, and the improvement derived as strikingly so. The two subjoined drawings define clearly the change that may take place.



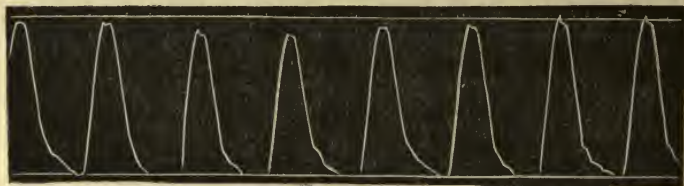
TRACING OF A GOUTY PULSE.



THE SAME PULSE AFTER A MONTH OF MODERATE CYCLING.

Marked Valvular Disease.—It is quite astounding to me, in examining patients who are active, how they live through cycling work while yet they show distinct signs of cardiac valvular disorder. The late Dr. Bridgeman of Berkeley consulted me on this matter. He had as marked signs of mitral constriction, with aortic murmur and regurgitation, as I have ever listened to, and yet he persisted in riding the bicycle. To what extent the circulation was disturbed is shown by the next sphygmographic tracing, which I took from his radial pulse. I was very candid with him, as was my friend Dr. Watters of Stonehouse, who took part in the examination; and

the patient himself was fully aware of his state, but still he persisted in his course. He argued that his heart was the same before he commenced to ride the cycle, and that, instead of being embarrassed by the exercise, he was relieved by it, and had ridden in one journey from Berkeley to London. He insisted on making me see him mount and ride, at a sharp pace, to prove his skill. He never changed his determination whilst he had power to sustain it, and although he died quite suddenly at last, his death had no connection with any immediate strain or shock from the cycle.

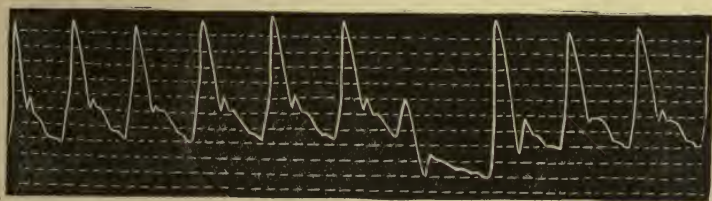


TRACING FROM PULSE OF THE LATE DR. BRIDGEMAN.

This is not a single experience of a similar character, and I have learned, unexpectedly enough, that the dangers of extreme valvular disease of the heart are not frequently increased by cycling, an observation which accounts for the perplexity of Dr. Petit, that there are so many riders suffering from heart disease, and comparatively so few sudden deaths, as a consequence of the exercise.

I do not name this subject to suggest that patients crippled by valvular disease ought to be allowed to ride the cycle. On the contrary, I usually advise them not to ride, because I do not know how to differentiate between what is a dangerous condition for the exercise and what is not dangerous. But it is my duty to point out the fact as it is, and not to let any ignorance of my own interfere with or blur the description.

Intermittent Pulse and Palpitation.—In this condition, on which I am often consulted, I was once most chary in giving an opinion as to cycling. I have, however, seen so many examples of persons who have intermittent pulse riding the cycle with safety that I have ceased to fear. Persons over sixty years of age have, as a rule, occasional intermittency, and that intermittency is often brought on by flatulency, by indigestion, and by depression of mind. In such examples I have many times known that cycling has been of service. I now therefore do not prohibit the exercise when there is no more than intermittent action or palpitation; but I make the proviso that the exercise shall be taken on the tricycle instead of the bicycle, so that the patient can at any moment stop without alighting, and shall not be on the continuous outlook and agitation which attend the more refined and watchful method of progression. In the next diagram I give a tracing of a long intermittency, every sixth stroke, in which cycling proved of signal service.



INTERMITTENT PULSE IMPROVED BY CYCLING.

Anæmia.—Diverging for one moment from the heart to the blood, I state without reserve that cycling, when it is prescribed with judgment, is most useful in the treatment of anæmia. To women it is often quite a direct cure. Something, of course, is due to the out-

door air into which the exercise leads, but there is also a decidedly beneficial influence in the exercise itself, and in the improved character of the secretions which it evokes.

Effects of Overstrain in Cycling.—Hitherto I have spoken almost altogether in commendation of cycling, in so far as the heart is concerned. I must turn now to another side of the picture, and state that cycling may produce a chronic condition of the heart which is injurious. There are two classes of subjects who are affected injuriously. The first are those young persons, often mere boys, who are made to ply the machine, probably heavily loaded, for commercial duties and business. It is astonishing what an amount of work a youth can be trained to do. He can really do the work of a horse, owing to the weight of goods he can distribute, and the rapidity with which he can get through his task. Generally speaking too, the young people like the exercise, and are proud of showing off their skill and endurance; whilst their employers, knowing no evil from it, let them do all that can be done. The result is a greatly expedited circulation, and an extreme tension of the heart and arteries, these organs being as yet immature, and easily over-expanded under improper pressure. The effects are not immediate, but they lead to hypertrophy of the heart, and to those derangements of the blood vessels which follow upon dilatation of the arterial circuit. Afterwards, when the maturity is completed, and the organs of the body cease to grow, there is disproportion between the vascular and the other systems, which means general irregularity of function. A powerful left heart pulsating into a feebler body, and a powerful right heart pulsating into the pulmonic circuit, must of necessity be injurious,

and the truth is too well demonstrated in practice. I have seen this hypertrophy and cardiac over-action in so many instances I am convinced that when it is more correctly and widely understood it will be accepted that cycling is a factor of what may be termed disease from occupation, and that some steps will have to be taken that will limit the danger. It is not always that the danger is connected with occupation. It is the fact also that many well-to-do young persons, of both sexes, by the enthusiasm and competitive work they throw into the exercise, become affected in a similar manner, and have to be restrained, when that is possible, from too great an indulgence in the pursuit.

The phenomena which indicate injury are broadly marked. In the first place, the action of the heart shows actual hypertrophy, on which it is needless for me to dwell before an audience so extremely familiar with the affection. But there are other phenomena I must not let pass. There is often developed a general vibratory condition of body which is mischievous. It is shown in various acts of movement and thought; it is shown in an unconscious or semi-unconscious bearing of the body, which even becomes sensible to the subject of it at particular moments, when great steadiness is called for, as when sitting for a photograph; it is shown in over-desire for rapidity of motion, as if it were necessary at every moment to overcome time and curtail distance by labour of the extremest degree; and lastly, it is shown in what is really a kind of intoxication for movement which grows on the mind by what it feeds on and keeps the heart under the impression that it is always requiring the stimulation of the exercise. It is no false inference that this craving, or desire, is very much like the craving, or desire, for alcohol, and

its effects through the heart and circulation are much the same in the end.

The fact strengthens a view I have long entertained, that all cravings and impulses spring from the heart as from their centre, or magazine, and not from an independent brain; as if, in short, the heart were the mind-centre of motive desire and action.

I retain as the last point, under the present head of my discourse, the extreme conditions seen in those remarkable athletes who enter into competitions that have never before been dreamed of in the history of the world. Because these new phenomena have crept into the world, and because they have, as yet, excited little comparative notice physiologically, they convey the strange intelligence that men have been found able to travel, by virtue of their own bodily energy, five hundred miles, almost without stopping or sleeping, in twenty-four hours—a result that would have seemed, half a century ago, an actual impossibility to the most philosophical and least biassed mind. In such a feat the work done by the heart is the most astounding of all. If we calculate on Dr. Parkes' estimate that the daily work of the heart is 106,000 pulsations, yielding the equivalent task of raising 122 tons one foot, and if we add to that one-third more of work due to the cycling—a very modest addition—we shall find that the heart of the cyclist accomplishes in twenty-four hours a labour equal to lifting 200 tons' weight one foot from the earth, and this without sleep or rest on the part of the cyclist.

It is not, as it seems to me, within the range of possibility that such feats can be repeated many times by one person without mischief to the heart. I have

said so to cyclists many times, but one of the cycling athletic leaders asserts I am not fair to his class. He urges that I have reasoned from the bad results I have seen (and which he does not question), amongst riders who have not sufficient stamina, and who have been led by ambition to do more than they were fit to do. "The best athletes," he affirms, "do not suffer." I do not wish to be unfair, but I certainly have observed two facts: firstly, that the best athletes do not appear capable of keeping at their best for many years; and secondly, that several who are not quite the very best bring on themselves the most serious disease which cuts short their promising careers. The central change in them is in the heart and circulatory system. The heart becomes large, irritable, extra sensitive, and easily intermittent. The arterial vessels are distended, their elastic tissue enfeebled, and their function, as regards nutritive repairs, imperfect, in which state the very activity of the heart is a source of deep degeneration and break-up of the system generally. That I should have witnessed this order of change once would be sufficient excuse for bringing forward the risks of extreme cycling, and for venturing to draw the attention of my brethren to it; but, unfortunately, more than one instance has been under my observation.

III. A SUMMARY OF THE MORE SALIENT MEDICAL AND PRACTICAL CONSIDERATIONS.

The subject of heart disease from cycling is so novel, so little time has been allowed for observation upon it, and the morbid anatomy arising from it has, as yet, been so nearly nil, I may be very brief on the head of

practice. I will say a word or two before leaving the paper to your criticism.

Firstly.—Cycling, when carried on with moderation, may, in so far as the healthy heart is concerned, be permitted, or even recommended, by practitioners of the healing art.

Secondly.—In every case of heart disease it is not necessary to exclude cycling. It may even be useful in certain instances where the action of the heart is feeble, and where signs of fatty degeneration are found; since increased muscular exercise often improves the condition of muscle, and of no muscle more than the heart itself.

Thirdly.—As the action of cycling tells directly upon the motion of the heart, the effect it produces on that organ is phenomenally and unexpectedly great, in regard to the work it gets out of it.

Fourthly.—The ultimate effect of severe cycling is to increase the size of the heart, and to render it irritable and hyper-sensitive to motion, the cycling acting upon it like a stimulant.

Fifthly.—The over-development of the heart under the continual over-action and extreme over-action affects, in turn, the arterial resilience, modifies the natural blood pressure, and favours degenerative structural change in the organs of the body generally.

Sixthly.—A fact that has only been incidentally noticed in this paper is worthy of notice—namely, that in persons of timid and nervous natures, “neurotics,” the fear incidental to cycling, especially in crowded thoroughfares, is often creative of disturbance and palpitation of the heart, and ought to be taken into account in preventive advice.

Seventhly.—In advising patients on the subject of

cycling it is often more important to consider the peripheral condition of the circulation than the central. Enfeebled or worn-out arteries, that is to say, are more dangerous than the feeble heart, and, when connected with a heart that is over-active, are seats of danger. This same remark would, of course, apply to cases where there is local arterial injury, as in aneurism.

Eighthly.—Venous enlargement seems rather to be benefited than injured by cycling, and conditions marked by sluggish circulation through veins are often greatly relieved by the exercise.

Ninthly.—There are three sets of acts which are most injurious in cycling. (a) Straining to climb hills and to meet head-winds. (b) Excessive fatigue. (c) The process of exciting the heart and wearing it out sooner by alcoholic stimulants, to the omission of light, frequently repeated, and judiciously selected foods.

Lastly.—The time has arrived when practitioners of medicine everywhere should make observations for themselves that confirm or confute these observations, adding to them many more that I, of necessity, have omitted, in the brief period at my command.

THE LATE PREVAILING EPIDEMIC.

CONGESTIVE PNEUMONIA.

E have called the late epidemic of congestive pneumonia “influenza” for want of a better name. Perhaps it is as good as any other name we could have invented except pneumoparesis, and that is doubtful.

This time the disease began to manifest itself in London about the latter part of January or beginning of February. It was very extensive in the early part of March, and its general characteristics were so alike, it really is scarcely worth commenting on them for the sake of those who have witnessed them. I chronicle them briefly for the after years, in order that those who may follow us shall have a short history to fall back upon without wide trouble of research.

During extremely cold weather, with an unusually hard frost, and with the air very dry—hydrometer under 40°—the disease did not appear, at least not with anything like severity; but so soon as the weather began to fluctuate, then the symptoms became generally manifested. The disease was almost universal in its outbreak, attacking mostly the middle-aged and

those who were much occupied in work requiring mental labour. It did not appear to me to spread from person to person by infection or contagion, although it often happened that persons near to each other were simultaneously attacked. Thus, in the hospital to which I am attached, it seemed as if on one day, February 27th, 1895, every patient in the wards under my care was more or less subjected to the influence of the disorder. A patient who was recovering from typhoid or enteric fever was distinctly affected by it, and several of the nurses and attendants were seriously laid aside by it for several days. Also various outside patients, some suffering most severely, but none actually dying from the disease, were for a long time disabled.

PRELIMINARY SYMPTOMS.

As to the symptoms. The leading symptom was a general debility both of body and mind. The patients complained of inactivity and sluggishness, with depression of spirits and desire to sleep—in fact, all persons, however active in their dispositions, seemed to feel this condition, although they might move about in their common avocations, and decline to go to bed or otherwise be considered as invalided. I experienced this languor in my own person, and could not conceal the feeling, even when I did my best to throw it off; but whether this was from a species of imitation, or from some actual physical failure, I could not quite define, for doubtless a great deal of reading and talking about the matter was not without its effect; in my own experience also there was added the act of seeing people who were under the disease—a sight which unquestionably was not beneficial, for

frequently a sort of imitative contagion spread over me, never sufficient to prostrate me, but quite sufficient to make me desire that the night-time were near, so that I might rest in bed. A meal, however, I remarked, usually removed the sensation, and led me to work even later into the night than on ordinary occasions.

SPECIFIC SYMPTOMS.

That which occurred when the disease was more than a mere malaise ran in the following manner. The temperature of the patient usually rose two or three degrees on the Fahrenheit scale. There was some pain in the muscles and, diffused, throughout the body, attended with want of power. There was a white state of the tongue, and a peculiar anæmic appearance of the countenance, which occasionally became serious in its aspect. The spirits were somewhat depressed, but I cannot say there was ever positive fear. The skin generally was dry, and the bowels regular in action. The urine, copiously passed, was not commonly of high colour, but frequently contained albumen.

The organs that were chiefly affected were the lungs. The symptoms were not what are known as those of common catarrh; there was rarely any coryza, running from the eyes or nose, sneezing, or other common catarrhal signs; but early in the malady there was a cough, which soon became loose, and caused a rather free and tenacious expectoration. The breathing also was quickened and low, and the pulse ran up to a hundred or more, being in some persons small and hesitating, in others rather full and soft, but never, from the disease itself, intermittent. Indeed, I met with a case in which a gentleman advanced in life—he

was seventy-four years old—had his pulse for the time changed from an intermittent into a regular pulse. The cough was frequent in well-pronounced cases, and in its presence there was sometimes pain in the chest, which was referred frequently to the space between the shoulders, or to the lower lateral part of the chest. Whenever thoracic pain was well marked there was one physical sign to be detected, and that was a fine moist crepitation, which did not, as a rule, appear to be inclined to extend, but which certainly lingered and recurred, with recurrence of the general symptoms, accompanied, to some extent, by bronchial disturbance. This sign of crepitation was most commonly met with in the posterior part of the lungs, and was on one side alone. It remained stationary, as a rule, during the whole of the affected period, not extending very far into the lung and not passing into suppuration; whenever it extended at all there was exaltation at once in the temperature, with an increased feeling on the part of the patient of distress and feebleness, continued cough, and expectoration. In one instance, I knew these conditions to remain for a period of fourteen days, with utter inability on the part of the sick man to perform ordinary kind of work, or interest himself in surrounding subjects for any length of time. During this same period there was a great disposition for sleep, and it was always to the advantage of the patient, as I believe, if he indulged in it. Occasionally the sleepy torpid state would last with little intermission sixteen or eighteen hours out of the twenty-four. All through the appetite was impaired, the patients being apathetic as regarded food, as if they had lost the correct taste for it. They did not decline food when it was offered them, but a little excess nauseated them, and

some were affected afterwards with actual vomiting ; it therefore became rather a delicate matter to select proper foods in every instance, and this difficulty in feeding greatly increased the debility. All through the patients were exceedingly susceptible of cold, and I heard sometimes an expression of the sensation of cold when the temperature of the air in the room was as high as 70° Fahr., but thirst was not complained of.

It sometimes happens that when the nervous system is so seriously affected delirium becomes a symptom, but I did not meet with symptoms of acute delirium in any of the cases under my care. There was always some mental depression, amounting sometimes to melancholia, a singular kind of listlessness, as if life were a burthen and the parting with it were actually a relief. This view was expressed to me by more than one person who went through a good recovery, not with regret that recovery had taken place, but simply as a remembrance of the feeling which had existed. The feeling was not in any instance an idiosyncrasy ; it may be said to have been diagnostic and common.

FATALITY.

The disease was, throughout, fatal to large numbers of persons, death being in some extremely rapid in its occurrence. Death, when it occurred, was in the first instance due to what is usually designated nervous exhaustion, but the immediate cause of death was in the pulmonic circulation. It appeared to me as though the heart failed to send over properly its charge of venous blood from the right side to the left, through the pulmonic circuit. Upon this there was congestion, with patches of effusion into the parenchyma, and

that low pneumonic condition to which I have already referred. With the congestion were fluctuations of temperature—high at one time, natural or subnormal at another. I do not remember ever to have witnessed temperature charts which showed so much of irregular tracing. In course of time the lung mischief extended to the finer bronchial ramifications, and then cough, from effusion into the bronchial tubes, produced additional trouble. The obstruction in the bronchial surface cut off the oxygen from the blood, which greatly added to the lassitude, and was, I feel certain, a prominent reason for the listlessness of mind which prevailed. It was as if a kind of passive anæsthesia had been produced by a gradual asphyxia, and that vital power, mental as well as physical, then rapidly declined.

The mortality from the disease, whatever may have been the cause of the epidemic, was quite alarming both in London and in parts of the country, exceeding anything we have seen for some years past. A portion of this increase in mortality was probably not due directly to the so-called influenza, but it was calculated that the whole mortality, mostly from it, reached to two hundred and ninety-six deaths in London alone in the week ending Thursday, February 28th. In some country places, if the disease occurred even during the same week, it seemed to create little mortality disturbance; thus Derby had the remarkably low death rate of fifteen in the thousand, while Liverpool, at the same time, suffered severely, the death roll amounting to as many as fifty-five in the thousand. In all cases it appeared, as already indicated, that death was due to lung complications, congestion of the lung and pneumonia being the common symptoms. The feeble suffered most severely,

the aged feeble or the comparatively aged being the chief victims. It looked as if the escape from the disease was not a positive test of all vital strength, for although the young escaped, according to my observation, in a striking degree, the women, who had the disease in smaller numbers, relatively, afforded a smaller mortality from it in proportion to those of them who were attacked, and their symptoms were less prolonged. This result might be due to the circumstance that men were more exposed to strain of mind and to fatigue of body. Men engaged in great labour were certainly the readiest victims, and mental work was certainly not less dangerous than physical.

As to cause we are quite at sea. On the question why some suffered severely, while others went unscathed, we are equally at sea. At this time we are still in the throes of a medical speculation which assumes that nearly every conceivable disease of the epidemic form arises from what are said to be germs. The air, it is assumed, is charged with germs, and certain of these, taken into the body, cause the disease. This poor speculation is not new to our day; it is the revival of a notion called in the last century the "animalcular" theory, and which was in vogue as late as 1825.

At the period when this hypothesis underwent revival, on the instigation of the late Dr. Grove of Wandsworth, I endeavoured to show that it was an hypothesis founded on analogy, one of the most feeble of all human ideals, and that there really was not so much evidence of its truth as would enable a man to pass successfully through a court of first instance, were the evidence about it under legal supervision, and were its witnesses liable to chances of punishment if they, even unwittingly, were guilty of perjury. Many, perhaps three-fourths of

the unspoken profession of medicine, have agreed with me, and have laughed in their sleeves at the whole thing. But a few active spirits, deluded as their predecessors, and led by a few Continental enthusiasts, have kept the craze going, and even in regard to the present development have maintained as a fashionable mode of exposition the fancy that the disease lately witnessed was contagious, that its physical origin could be demonstrated, and that it spread from person to person as lice, fleas, or the itch insect might. Hahnemann declaring that all disease had a common origin from psora was quite as philosophical, and was as likely to be correct in his assumption.

All that could be said of cause was that there existed a condition in which numbers of persons susceptible to its influence were attacked, while numbers escaped. Whenever this occurs it will necessarily seem to some minds as if one person carried the disease to another person whenever another person suffered after some possible contact. One of the worst examples of the disease occurred under my own observation, whilst not a second person in a household of nine showed the least sign of the malady. In another instance one suffering person was recorded as having communicated it to every member of an equally sized family. For my own part, in the very midst of the epidemic I could not satisfy myself that a single instance of contagion came under observation when all the circumstances were taken into account. Of course I may have been blind to evidence, but I am not blinder than my fellows, and it more than once happened that the data on which the idea of contagion was gathered turned out to be absolutely false, not intentionally false, but mistakenly so. I do not bow to what is

called "authority" on this matter; I bow only to natural truth, and that is negative on the question of infection, to say the best of it, or, to be more honest still, I am entirely ignorant of the true cause. The most probable cause was something meteorological; but in the present "bacteriological" rage everything has to go to pieces. An earthquake might now arise from bacteria in the bowels of the earth; a man who should fall from a scaffold might be kicked over by a bacillus and killed on the spot, indicating that the place he fell from should be disinfected as a mere matter of course. Let us be candid in our ignorance. All we really know is that the cause at work to produce the late epidemic was widely distributed, sudden in its development, and selective in its action, both in regard to individual persons and individual localities.

TREATMENT.

No very great advance has been made in respect to the treatment of persons under "influenza." "The symptoms have to be met as they arise," was the wise saying of one of my old medical brethren when I asked him what was his method of treatment. It is a magnificent statement this, not original, not particularly perspicuous as to its intention, but singularly satisfying to clouded minds. Perchance, there could not be a better idea for the moment, and if we only knew how to meet one symptom after another and conquer each symptom on the plan of one up and another down, it would be very difficult to find a more scientific practice. It sounds well, as if we knew how to meet every individual symptom, but where there are such a number of symptoms the mere removal of one might only leave

us to look out for another that might floor us at our best. We are clever for one moment, and we hope to be as clever the next time we are wanted. We stop cough, but then comes fever; we reduce fever, but then comes weakness,—an awful series of combinations. After all, I really believe that sometimes we successfully did meet symptoms as they sprang up, and that such meeting of them was our best art. It was all tentative, and it now and then failed; but that was no fault of ours: we did our level best; the world fairly approved, and, as an ancient oracle would say, the gods found amusement if little satisfaction.

The best thing for meeting all the symptoms was to send the afflicted patients to bed as soon as possible; to get them into a warm and equable atmosphere—64° Fahrenheit was apparently about the thing—to keep them well supplied with light nourishment, given at frequent intervals, and to allow them to sleep to their heart's content. Medicinally, all kind of remedies were recommended, with this general observation, that any medicine which interfered with digestion, or destroyed the taste for food, was worse than avoidance of all medicines. I usually prescribed with best effect ammonia combined with small doses of digitalis. To quicken the heart by what are denominated alcoholic stimulants had two of the worst effects: firstly, the process, in the end, weakened the action of the heart, having the same effect on the cardiac muscular fibre as running would have, or any other violent exercise by which the power derived from the fixed nervous system, a system already exhausted, would be largely drawn upon at a critical moment; and, secondly, the increased excitement of the heart, without addition of power, tended to inject the lung structures freely, and

to give rise to congestion, which, added to the primary pneumonic condition, favoured the extension of obstruction. Nothing could have been more favourable in result than the treatment followed in the practice of abstinence, and I am satisfied that such abstinence from all alcoholic stimulants had as much to do with success as the care that was taken to secure good feeding, equable warmth, and mental and bodily repose, to the greatest possible extent.



OPUSCULA PRACTICA.

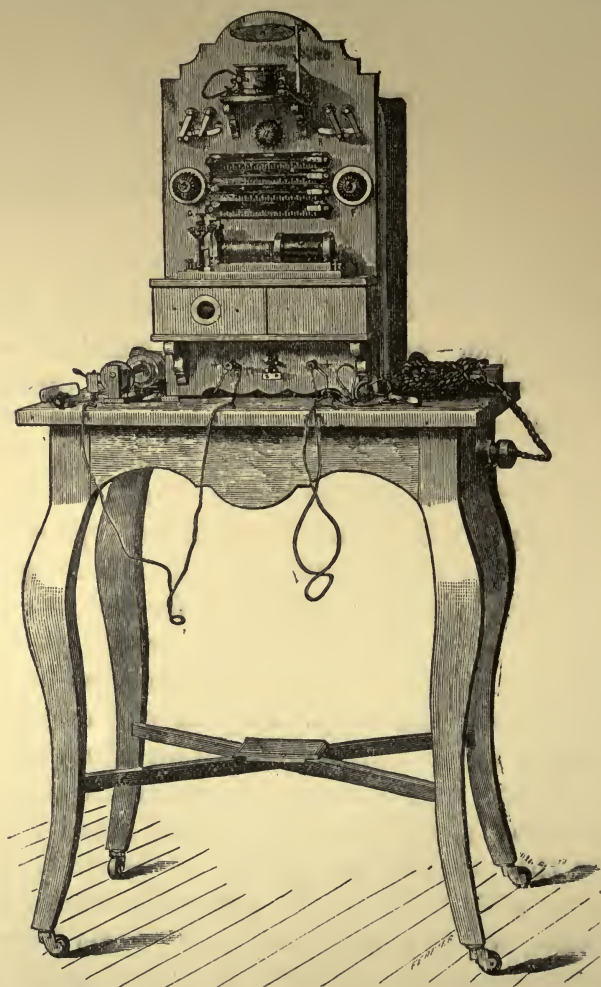
"There are mites in science as well as in charity."

BENJAMIN RUSH.

A CLINICAL ELECTRIC CABINET.

HROUGH the generosity of Mr. John Edward Taylor we were recently enabled in the London Temperance Hospital to obtain the electric light in the wards. As the current is continuous and there is a means of obtaining a light at every bed, it occurred to me so soon as I saw the current in application that it might be applied to an electrical cabinet which could be easily moved from bed to bed and supply all the necessities for the use of the sick-ward in all classes of cases in which electricity promises to be useful. I named this proposition to the generous donor of the supply, and he at once assented that I might, at his expense, construct a cabinet that would suit the requirement. I communicated with Messrs. Faraday, the electricians, and asked them to make for the hospital the cabinet as designed in the sketch on p. 262, and they have efficiently carried it out. The cabinet, which moves readily on wheels from bed to bed, contains in a comparatively small space what is required in the wards of a hospital. By the introduction of a special fuse at points of connection, a continuous and measurable current is brought from the wall at the head of each bed, and is connected with the

apparatus, which is so arranged that there can be given a continuous and measurable current, an intermittent current, a light with a reflector for illuminating the



throat, an electrical cautery, and a Hughes electrical balance that enables the hearing of a patient to be most carefully tested, serving, in fact, as an acoumeter.

The cabinet has now been in use for some weeks,

and answers every purpose for which it was intended. The reflector, placed on the upper part over the galvanometer, enables us, when we use the continuous current, to take an exact gauge of the strength of the current, and the part of the apparatus which gives us the intermittent current enables us to use the Faradic brush, and all other parts relating to the secondary current, with easy precision. The presence of the Hughes electrical balance is extremely useful, not only as a means of gauging the capacity of a patient for hearing, but also as a means of diagnosis which is novel in its character. In this latter diagnostic use we produce with the microphone the same loud vibration in the telephone attached to the instrument as when we are testing the hearing, but instead of applying the telephone to the ear, an assistant places it to the part of the body under examination, and then in the surrounding parts we examine with the stethoscope to what extent the sound through the telephone is transmitted. In such manner we gather, to some extent, the nature of the substance through which the sound is transmitted, and I shall hope in a future paper to define what differences are produced by solid substances and fluids present in the cavity of the chest or in subcutaneous cysts or extravasations.

We are now inquiring with this apparatus to what extent the physician may be able to introduce medicinal substances into the body through the cutaneous surface after the manner originally tried in the process I originally called Voltaic Narcotism, in which an anæsthetic substance was placed upon the skin, covered with a metallic plate proceeding from the anode, whilst the opposite pole was attached to the hand or some other part of the body of the patient. I have also been

trying the effect of a continuous insulated current folded carefully round an affected part, as it is wound round in a coil, and with the current in continuous action for several hours.

Of the effects of these different modes of applying electricity for the treatment of disease it is not my object at this moment to speak, or to dwell practically upon the same. My wish at present is to describe a useful apparatus, which I trust will be introduced into other hospitals, so that observers may gain measurable and accurate results with the uniformity and precision necessary before electricity can be accepted as a positive aid in medical inquiries.



NOTE ON THE POSITION OF THE LEAD AND WATER QUESTION.

N observation in my "Medical History of Birmingham" (in the *Medical Times and Gazette* of October 15th, 1864, p. 419), on the effect of saline substances in water, for preventing the oxidation of lead, gave rise to inquiries as to the exact position of the lead and water question. In the following remarks the principal facts on the question are briefly embodied:—

Until recently the popular creed, professional as well as public, on this subject has been that—

1. Pure or soft waters alone act on lead, and do so in proportion to their purity or softness.
2. A minute portion of certain neutral salts in water prevents its action on lead.
3. Hence, hard or impure waters do not act on lead, and may be safely stored in leaden cisterns and conveyed through leaden pipes.

In 1858, however, Dr. Lindsay, of Perth, laid before the British Association the record of a series of experiments and observations made by him on this important subject during the previous year. His main or general results were tabulated in the following series of propositions :—

1. Under certain circumstances pure or soft waters *do not* act on lead.

This was well illustrated by the results of the inquiry instituted in 1854-5 by the Town Council of Glasgow, in connection with the proposed water supply to that city from Loch Katrine. This inquiry cost £5,000, and was of the most extensive and exhaustive character. It proved, *inter alia*, that Loch Katrine and other equally pure or soft waters (containing under 2 or $2\frac{1}{2}$ grs. per gallon of solid matter, with a hardness of 0·6 to 0·8 of Clark's scale) exerted, under given circumstances, no deleterious action on lead.

2. Hard or impure waters, sometimes containing abundance of the very salts which are generally supposed to be most preservative or protective, *do act* on lead, and with the same rapidity and efficiency as pure or soft waters.

This was illustrated by the destruction of lead cisterns through the erosive action of hard water in the Murray Royal Institution (an hospital or retreat for the insane of the middle classes), near Perth, of which Dr. Lindsay was the physician. This early destruction of lead first directed his attention to the subject.

3. We are in possession of no satisfactory information anent the causes of the varying action, under different circumstances, of water on lead ; information, that is, which is of any practical use in assisting

either in predicating or preventing lead-erosion or lead-contamination.

4. *Experimentation on the small scale*, and for short periods, is most fallacious, and frequently dangerous in regard to the practical conclusions thence to be drawn.

5. Contamination of water, both hard and soft, impure and pure, by lead is, in all parts of the kingdom, and under every variety of circumstances, the cause or source of various obscure diseases of man (and also, doubtless, of the lower animals), of the nature especially of dyspepsia and colic.

This proposition was abundantly proved by cases of minor diseases induced by lead-contamination of various of the hard or impure waters of London.

6. So uncertain is the action of water on lead, so impossible is it to predicate the nature or extent of that action under the varying mechanical and chemical conditions of water supply of houses and towns, so difficult is it to prevent the possible dangers, so numerous and excellent are the substitutes that may be provided for lead in the construction of cisterns and pipes, that it is desirable henceforth to *abolish the use of lead as a material for the conveyance or storage of water*.

This practical proposition, to which all the others converge or lead, is now adopted and as far as possible is acted upon by our most competent and eminent authorities.

The Royal Victoria Military Hospital at Netley, which ought to be the embodiment of all modern progress and discovery in sanitary science and hygiene in their applications to the construction of human dwellings, has long used *no lead* in its water cisterns or pipes. A writer in *Good Words* said of this hospital: "The

water supply has been carefully attended to, and to prevent the possibility of patients suffering from lead-contamination, not an atom of that metal has been used in the construction either of the pipes or cisterns. The former are made of block tin, and cost £9,000. It would be well for the health of the community if in our private houses similar precautions were used."

The Commissioners in Lunacy for Scotland, in their regulations about the construction of lunatic asylums, have remarked in regard to water supply: "It is of the utmost importance that there should be a constant and ample supply of good water, of which a careful analysis should be made, with a view to determine the proper materials for pipes and reservoirs, and also in order to ascertain fitness for the purposes of drinking and washing." The reporters add: "Lead is an objectionable material for pipes and reservoirs, as adulterating the water." The late Dr. Hassall, the "Analytical Commissioner" of the *Lancet*, and the author of the well-known work on "Food and its Adulterations," says: "From the number of samples of water I have received containing lead, I am induced to believe that that metal is more frequently introduced into the system in this way than is commonly suspected. Indeed, so many well-ascertained cases of lead-poisoning, arising from the use of water contaminated with lead, have occurred that I am of opinion that the use of lead for the storage and conveyance of water ought to be entirely discarded, especially in the cases of small towns and single houses."

Again, the late Dr. Dundas Thomson, a former President of the Metropolitan Association of Medical Officers of Health, who for many years paid, as a chemist, great attention to the subject of water supply, and than

whom, on such a subject, there was no more competent authority, remarked: "It is impossible too strongly to condemn the use of lead pipes and cisterns. They should never be used for conducting and retaining water for drinking and culinary purposes. It is difficult to understand the origin of the employment of a poisonous metal for domestic use. But its disuse must depend upon the substitution of the builder or iron-pipe fitter for the plumber, who has so long monopolised the manufacture of this noxious form of cistern."

The Americans apparently attribute a greater value to this subject than we do, having devoted a goodly volume to the evidence pro and con.

In 1859-60 the great lead and water question was the subject of much public discussion in the columns of the *Times*. The result was a general feeling that the public safety lay in the abolition of lead in the construction of cisterns and pipes for water supply, some writers going so far as to recommend a prohibition by Government of the use of lead. The subject, notwithstanding so many years' experience, still remains in a very unsatisfactory state.

USE OF THE WARM BATH IN DIAGNOSIS.

I HAVE often made use of the warm bath in diagnosing the condition of the abdominal organs, and I am satisfied that this method admits of greater improvements than it has yet received at my hands. I offer it as a suggestion to younger practitioners, as I am in duty bound. In order to carry out the plan, the water in the bath is brought up to the natural temperature of the body, and the

patient is allowed to recline in the water, with all parts immersed, except the face and head, for a quarter of an hour before the examination commences. By that time the skin has become flaccid, and the parts beneath, especially in the abdomen, are more readily felt through the abdominal walls. On the nineteenth of March this year I used the bath with excellent effect in the case of a hospital patient who was deeply jaundiced. In the bath the complete relaxation of the abdomen was an immense advantage. I could, without difficulty, feel and define all abdominal organs through the abdominal walls—the uterus, the kidney on each side, the pancreas throughout its length, and the line of the colon. I could feel the pulsating aorta, and the outline of the liver was revealed almost as well as if it could be seen. Both lobes of the liver were felt to be enlarged, firm, smooth; no cystic growth or tumour could be detected at any point, and no obvious enlargement or distention of the gall-bladder could be found beyond the line of the margin of the liver. The pancreas was felt to be rather enlarged and firm. My diagnosis was that the liver was condensed in structure and enlarged in growth, and that there was disease of the pancreas. The patient gradually sank, and the post-mortem confirmed the diagnosis.

It may be urged that the examination of the body in the bath is applicable only for emaciated subjects, and in them it is no doubt specially applicable. But it is surprisingly useful in obese subjects also; the relaxation in their case is beyond what would be expected, and the organs in the abdominal region are much more clearly defined than under the common conditions. It admits of inquiry whether the specific gravity of organs cannot be made out by this water test. It would be

no very difficult task to determine what is the natural specific gravity of a human body of a given weight, and then, by using a saline fluid of the same gravity, to determine whether the body were above or below what it ought to be during immersion in the fluid. We could in this manner detect whether a large tumour in the body or the limbs was solid or fluid, and to a considerable degree determine its nature.

It would also be a good lesson to ascertain and formulate the normal specific gravity of every organ separately, from which step it might be ascertained whether in any case of disease of an organic nature there was reduction or increase of gravity of a suspected organ.

ON THE AUSCULTATION OF JOINTS.

THE auscultation of joints has been with me, for many years past, a practical study of considerable interest, and, I venture to think, of considerable value in respect to diagnosis.

It is a study that ought to have been noticed in these pages long before this time, but there is not sufficient time to do everything one wishes, life being so short, art so long. Let me make up a little, now that the opportunity is at length found.

In joint affections auscultation is quite as useful as it is in affections of the lungs, but it requires to be learned in its details before it can be fully applied. Joints that are healthy must be auscultated as well as joints that are diseased, and joints that are diseased must be auscultated and learned according to the kind of diseased condition that may be present. Distinction must also be made of the sounds that arise from the friction of bones in their sockets and upon each other.

For conducting this kind of examination the double stethoscope is the best, but I sometimes use the simple differential stethoscope, which consists of two single-mouthed tubes quite separate, the ear-pieces of which can be adapted one in each ear. The mouthpiece should not be large—three-quarters of an inch in diameter is sufficient—and it is advisable to have the mouthpiece covered at its edge with indiarubber, so as to avoid external friction. If the double stethoscope be not at hand the ordinary wooden instrument will suffice; but there is this advantage about the double one, that it enables the operator to manipulate the joint and bend it without the aid of an assistant, although an assistant is always of excellent service.

When a joint is quite healthy and the person auscultated is young, there is practically no sound or movement whatever. No sound will be heard, except a very gentle soft friction sound, if the movement be made in such a manner as to bring the end of the movable bone with some force into collision with the joint or bone that opposes it in the socket. When a sound is produced it may be called a cushioned sound, and it ceases the moment the action that produced it is slowly carried out without pressure. A very little derangement within the joint itself—less than a friction that produces impediment of motion, much less than an impediment that gives rise to pain—leads, however, to sounds that are distinguishable, the abnormal sounds increasing in degree as the impediment within the joint is intensified or modified. There are, at least, five modifications of joint sounds; they may be defined as: simple dry friction sound; dry grating sound; coarse grating sound; moist crepitant sound; and, coarse crepitant sound.

THE SUBSIDENCE OF GRIEF.

ONE of the most singular phenomena in human nature, one which concerns very much the observation of medical men, is the departure of grief from the injured mind. If there be such a thing as a provision in nature, foreordained we might almost say, it is this fact ever recurring, the departure of grief. If grief did not depart I really believe the living human being would die of it, for grief is a disease or concentration of morbid symptoms which are so severe they must needs be fatal if they were long continued. Happily they pass away in as regular an order as occurs in subsidence of any other disease. Even in the acutest stages of grief there are periods of remission. The afflicted "cry out" their grief for a time, or, as it is commonly said, "find relief in tears." It is strictly true that weeping does bring relief, as if there were a highly susceptible centre in our organism which can be rendered inactive by the excessive secretion of water currents from the eyes. This centre is not in the reasoning nervous structures. It is not cerebral; it is organic, vegetative, sympathetic, and it is really not under the control of the will. It follows, therefore, that time cures, the solid reasoning centres holding their own, and the more sympathetic centres steadily regaining their natural functions. There is no reasoning in grief, and the sensations of it, like those of happiness, are never in the head, but in that nervous chain which belongs to the heart. So it happens that when grief has passed there is in the reasoning soul often a placid remembrance of the very object that may have called up the acutest manifestation of sorrow.

Most probably the difference of the organic structure of the great classes of nerve is the cause of the difference of action. The sympathetic chain must be highly sensitive to the ethereal impulses, the reasoning centres comparatively resistant. The more sensitive centres would be destroyed and recuperated, while the resistant would remain steady to their function.

I do not remember many instances in which grief has caused serious actual disease. Yet I have met with the result a few times. I recall a mother in whom, on the death of her child, there occurred an intermittency of the action of the heart, which has never since passed away; and as the heart is so largely under the control of the sympathetic system, the wonder is that this accident does not more frequently take place. I have seen some other symptoms of a melancholic kind, but they are not so permanent. It is noticeable also that acutest symptoms at first are often the briefest, and that the sharpest grief is often the soonest over. Women, with their large sympathetic organism, feel, for a time, grief more forcibly than men; which is a fact quite in the order of nature.

To us medical men the onset and departure of grief is a phenomenon we should always be able to recognise and advise upon. We can explain better than any other persons the cause of the phenomenon of grief and its natural subsidence. We can at once forgive the many silly mistakes about ourselves and others which grief-stricken people commit; and we can live in the everlasting sight of it without being its victims, which is one of the most merciful dispensations for ourselves and the world that ever was granted to humanity.



THE GALVANIC CURRENT IN STRABISMUS.

THE *Medical World*, vol. xiii., p. 98, contains a valuable note by Dr. Capell on the above-named subject. Dr. Capell applies the negative pole of a galvanised battery of from three to six cells to the short rectus muscle, and the positive pole from the same battery to the long rectus muscle, on the theory that the negative weakens the muscle it is applied to, and the positive strengthens the muscle it is applied to, so that the one corrects the other. He publishes a case in which recovery seems to have been fair, and a second case, still under treatment, in which there was improvement. I notice the fact because, quite apart from the theory suggested, I did myself experimentally once use the same treatment with very considerable success in a boy who was the subject of a double squint. I found no difficulty in making either eye quite straight while the weaker muscle was under the positive current, and, by many times repeating the application, the patient made so good a recovery that, meeting him a few months ago—now a well-matured man of thirty—he presented a perfectly natural appearance as regards his eyes, and he thanked me most heartily for what I had been able to do for him in his childhood. The only difference between the method I then employed and that of Dr. Capell was that I used a gentle Faradic current, under which the eyeball became straight at once, and was held so for a full hour. The reason why this plan has not gained ground in practice is, I think, the slowness of its action, or rather, I should say, the necessity of its frequent repetition. When a surgeon can in two or three

minutes cause by a slight operation what it would take six weeks to effect by the electric current, the operation is sure to win the day. But, as Dr. Capell properly says, there are some cases in which it may not be advisable to operate, and there are, it may be added, some persons who would prefer for themselves or their children that the electric method should be employed. It is well, therefore, though it is not good practice to multiply too many remedies for the cure of one disease, to bear in mind the plan here suggested; it is a scientific plan, painless, simple, and, properly carried out in its details, effective.

STERCORACEOUS VOMITING AS A SIGN FOR OPERATION.

IT may be remembered that in a paper published in a preceding number of the ASCLEPIAD I advanced a view founded on experience that stercoraceous vomiting in cases of obstruction of the bowels is the sign that the time has arrived for surgical interference. Many other practitioners agreed with me, others did not; and, amongst my learned opponents, no less important an authority than Professor Gairdner of Glasgow wrote me that he had himself seen recovery without operation even when stercoraceous vomiting had presented itself. I had never seen such a case, and have not until the present time, when it is right to state that the fact has occurred to me in a young man who was admitted into hospital under my care during the past three months.

The case, which came under the technical head of *typhlitis*, was one of extreme severity. Constipation had lasted seven days; no flatus was passed by the bowels;

there was free vomiting of most offensive stercoraceous matter; the abdomen was tender on pressure; and collapse was imminent. Enemata were simply returned, and aperients failed. Seeing the urgency I transferred the case to my surgical colleague Dr. Collins, with a view to operation; but he, finding on digital examination that fæces had descended into the rectum, delayed operation, ordered further enemata, and had the stomach well washed out with warm water, relieving it of more fæcal fluid. The result was satisfactory; relief was obtained in the natural way, and the patient is now in a fair way for recovery, a fact which indicates that a dogmatic rule to the effect that stercoraceous vomiting calls for operation may be exceptionally incorrect. At the same time the question remains, When is operation absolutely demanded?



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J. Abernethy

*Autotype from a rare
engraving; date about the
year 1820. Artist unknown*
BVR

JOHN ABERNETHY, F.R.S.

AMONGST the people there is perhaps no medical name so commonly known as that of John Abernethy, and on the first of May of this year, when there was a *conversazione* at St. Bartholomew's Hospital to celebrate his centenary, no name seemed more familiar to the assembled guests. In the great hall of Bartholomew's there is a fine portrait of the man, which, decorated modestly and with good taste, stood out prominently; but so strong a personality has Abernethy left it almost seemed as if he himself were still present dominating over the assembly and settling the knottiest points by the force of his opinion.

In biographical history those persons exercising special influence over their compeers are of singular character. Their influence is all-pervading and persistent. They may not be great of the greatest; they may do little that is really original and lasting; but they live on. I asked more than one well-informed neighbour, "What is your sense of comparison as between Abernethy and his cotemporary Thomas Young?" They furnished no comparison. To them Young was a negation, Abernethy an affirmation, and

that is just the difference. Between the two men there was the distance of the two mental poles. Young was a genius of the polar type, a sun too distant to be understood, deciphering a language that had been for ages dead, and readable only in ancient symbol. Abernethy, doing in singular form what was really commonplace work, work of the earth earthy, was nevertheless heard and understood by all who knew him, was always cutting his name deep in the minds of his cotemporaries, and transmitting it through them to their successors.

It is fortunate for biographical history that we have the life of John Abernethy very neatly written by one who knew him well, the late Mr. Thomas Joseph Pettigrew, F.R.S., a man I more than once had the pleasure of meeting in my early life. It is also fortunate for me that two others who were acquainted with him, namely, the late distinguished Professor Sir Richard Owen, and the late eminent Dr. Robert Willis—for many years librarian at the Royal College of Surgeons—and three patients who had been under the care of Abernethy, have all recounted to me anecdotes in respect to him, with a good many stories of his eccentricities, about which a little more further on.

Pettigrew says, from his direct knowledge, that Abernethy was born in London on the site of what is now known as Finsbury Circus, and that the year of his birth was 1765. He adds that Abernethy's father was a native of Scotland, his mother of Ireland, and that his uncle, a literary man, was known as an author of some tracts and sermons, which have lived on, although mere curiosities, into the present day. As a boy Abernethy does not seem to have passed through anything like a classical education; he was placed at a

school in Lothbury, and was brought up under a teacher by whom classical lore was little esteemed. He was "apprenticed," as it was then termed, to Mr., afterwards Sir, Charles Blicke, one of the surgeons of St. Bartholomew's Hospital, and he attended the lectures of Sir William Blizard, Mr. John Hunter, Mr. Hewson, and Mr. Falconer. He probably also attended the clinique of Mr. Pott, who was one of the surgeons to St. Bartholomew's Hospital. On the retirement of Pott from the hospital he became assistant surgeon, and remained in that position for twenty-eight years. Soon after his appointment as assistant surgeon he began to lecture, at the hospital, on anatomy and surgery, laying the foundation of that St. Bartholomew's School which has since become so famous in medical science. In his day medical teaching was divided between what may be called a more or less complete hospital school, and a system of teaching carried on by individual men, sometimes at their own homes and sometimes at the hospitals with which they were connected. About the time when Abernethy was at his prime, the London Hospital seems to have taken the lead as a school, but many private lecturers had good classes. It is curious to read the announcements of the courses as they then appeared. I turn to a page or two of advertisements of the session of the year 1806, and find that Practice of Physic was taught by Dr. Cooke at the London Hospital; Chemistry by Dr. Hamilton and Dr. Yelloly; Medicine and Materia Medica by Dr. Frampton; Midwifery by Dr. Dennison; Anatomy, Physiology, and Operations of Surgery by Mr. Headington and Mr. Frampton; Demonstrations of Dissections by Mr. Armiger; Surgery by Mr. Headington; Clinical Surgery by Sir W. Blizard and Mr. T. Blizard. This

was a complete school for its day, and ran as a rival with the Medical Theatre at St. Bartholomew's Hospital, where Anatomy and Physiology were advertised as by Mr. Abernethy, and the Theory and Practice of Surgery by the same teacher. Here also Drs. Roberts and Powell taught Practice of Medicine; Mr. Macartney Comparative Anatomy and the Laws of Organic Existence; Dr. Edwards Chemistry; Dr. Thynne Midwifery and Diseases of Women and Children; and Mr. Lawrence Demonstrations in Practical Anatomy. At the same period Dr. Badham gave his separate course of Medicine and Chemistry; Mr. Joshua Brookes his spring course on Anatomy, Physiology, and Surgery, at his Theatre of Anatomy, Blenheim Street; Dr. Clarke his lectures on Midwifery and the Diseases of Women and Children, at the house of Mr. Clarke, 10, Upper John Street, Golden Square; Mr. Chevalier, Principles and Operations of Surgery, at his house in South Audley Street, Grosvenor Square; Mr. John Pearson, Principles and Practice of Surgery; Dr. Reid, the Theory and Practice of Medicine, at his house, Granville Street, Brunswick Square, or at the Finsbury Dispensary, St. John's Square, Clerkenwell; Mr. John Taunton, Anatomy, Physiology, and Surgery, at his theatre, Granville Street; and Dr. Marshal, similar subjects, in Holborn. All these teachers have not only passed away, but have ceased even to be remembrances, with the exception of four—Sir William Blizard, Joshua Brookes, Mr., late in life Sir, William Lawrence, whom some of us personally remember, and the man whose life is now in hand, John Abernethy, who by the time here mentioned must have been a shining light. Abernethy, who was elected a Fellow of the Royal Society in 1796, started in practice in St. Mildred's

Court in the Poultry, a part of the city in which he proposed living for seven years ; but he soon moved to Bedford Row, which he called the middle part of the town, and in which he continued to live during the whole time that he was a practitioner in London.

THE WORKS OF ABERNETHY.

A careful perusal of the works of Abernethy indicates how thoroughly he had become imbued with the doctrines taught by John Hunter, whom he knew, and who showed him favours, which, as a young man, he somewhat slighted, as he afterwards himself confessed.

TREATMENT OF LUMBAR ABSCESS.

Abernethy first became an author when he was thirty-two years of age, by publishing a series of papers entitled "Surgical and Physiological Essays." The most important one was on Lumbar Abscess, in the treatment of which disease he introduced principles that have been considered as novel in these days, a kind of subcutaneous incision, and an antiseptic proceeding. He had observed that in opening a lumbar abscess, if the incision were made direct through the skin into the cyst containing the matter, and if the wound were left open so that the external cavity was exposed to the air, the remaining pus, after the abscess had been discharged, underwent decomposition, which led to continued discharge and to great irritation, ending often in a serious or even fatal condition. He therefore made a puncture into the cyst, discharged the matter through the opening, and then closed the opening in such a way as not to allow the wound

through the skin to correspond with the wound that had been made through the cyst. In this way he prevented the entrance of air into the wound. The sac contracted without any decomposition, and cure seems to have been effected in a very considerable number of cases.

Another method he introduced was that of evacuating the contents of the abscess by small punctures, frequently repeated, whereby the sides of the sac gradually collapsed and adhered. Mr. Ricaud, giving an account of the cases treated at the Finsbury Dispensary in 1802, speaks warmly in favour of this method, declaring it led to good recoveries, whereas if the abscess broke spontaneously hectic and death were the ordinary results. Finding his first volume popular, Abernethy next published an essay on "Injuries of the Head," together with particulars of "Experiments on Irritability in some Surgical Cases."

ON ANEURISM.

In 1807 he startled the surgical world by curing a femoral aneurism, reaching as high as Poupart's ligament, by ligature of the external iliac artery. It was the first time so bold an operation had been performed, and the case is worthy of a moment's special notice.

The patient was a woman named Jane Field. She was aged forty years, and had been in the habit of drinking to excess. She was admitted to St. Bartholomew's Hospital with a large femoral aneurism, reaching as high as Poupart's ligament. The whole of the limb was cedematous, and she was quite incapable of using the least exercise or of sitting upright. The pain was so violent as to preclude sleep. She had no appetite; her

pulse was frequent and feeble, generally exceeding a hundred; but her tongue was not furred, and her bowels were regular. In operating, Mr. Abernethy made an incision three inches in length through the integuments of the abdomen in the direction of the artery beginning just above Poupart's ligament. He divided the skin and aponeurosis of the external oblique muscle, and introduced his finger between the margin of the internal oblique and transverse muscles and the peritoneum. He then divided these upwards in the direction of the external wound, to the extent of one inch and a half, with a probe-pointed bistoury. Having thus made room for the admission of his finger, he put it down upon the artery, felt the pulsations, inserted the finger beneath the vessel, and, with the aneurismal needle, passed under it two thick ligatures, carrying them upward and downward as far as the detachment of the artery permitted, tying them firmly. He next divided the artery in the interspace, but nearer to the lower than to the upper ligature. The operation was entirely successful, and the patient had a good recovery.

In this operation Abernethy made an alteration in Mr. Hunter's method of tying an artery, namely, that he tied it in two places, and then divided the vessel between the ligatures, using a very thick ligature, on which method Mr. Cooper—afterwards Sir Astley—remarked that he thought the double ligature certainly tended to lessen the risk of hæmorrhage, but that there was a danger from the practice in that the ligatures were apt to slip off the ends of the vessel which had been divided between them; an accident of this kind happened to himself, and the patient would probably have died if he had been removed from the

table. In order to prevent such an accident Cooper conveyed the ends of the ligatures, by means of two blunt needles, under the artery, excluding the vein and nerve, and passed the threads through the cellular membrane surrounding the artery. When these ends were tied and the artery divided between them, the ligatures were prevented from slipping from the artery by the cellular membrane through which the ends were passed. Cline, however, objected to the double ligature altogether, from the reason of the accident of slipping having also occurred in his practice.

A curious circumstance in relation to Abernethy's case is that he used the thermometer, locally, in the treatment of the case. He ascertained by a Fahrenheit thermometer the degree of heat in the limb in which the external iliac artery had been tied, and compared it with the heat of the healthy limb, and found on the second day the affected limb four degrees lower in temperature than the limb which had been operated upon. On the fourth day the two limbs were of the same temperature. This was a very successful case, and a good recovery being the result, it ranked as an event in the surgery of the time.

In another example, in which a German sugar-baker was the subject, Abernethy performed a similar operation, but death followed, owing, apparently, to escape of blood and putrefaction of it in the femoral artery. The untoward result led him to suggest that in another case, if signs of putrefaction of the blood should ensue, he would make a small opening into the aneurismal bag for the removal of any contained blood, and this being done, if no blood came from the lower orifice of the artery there would be no necessity for tying it near the sac.

A NEW GORGET.

In operating Abernethy appears to have been extremely skilful and collected. From the commencement of his lectures on the operations of surgery he was, he says, accustomed to tell the students that surgeons seemed to him too fond of inventing and using new instruments; that the way to appreciate the perfection of an instrument was to inquire what was wished to be accomplished by it, and if this was effected it was absurd to change one method for another. This very sound advice was addressed to Dr. Batty, in May 1803, *à propos* of a gorget he (Abernethy) had invented, as an improvement on Hawkins' gorget, in which the cutting edge had, in every part, the same direction, turned up at an angle of 45° . The instrument exactly accomplished, its inventor urged, what it was designed to execute.

MERCURIAL FUMIGATION IN SYPHILIS.

An essay entitled "Diseases Resembling Syphilis" introduced a powerful argument to the effect that there are very often cases of disease resembling syphilis in which there is really no specific infection—pseudo-syphilitic disease. He gave several instances in point, one particularly in which a certain woman communicated this pseudo condition three times to the same man. In the treatment of true syphilis he tells us he was very distinctly in favour of mercurial fumigation, and informs us that the method was introduced in the year 1776 by the Chevalier Lalouette, a physician of Paris. He found this method, he says, in the majority of instances a more powerful and innocent means of producing the mercurial affection of the

constitution than inunction, or the external use of mercury, and equally certain of radically curing the disease for which it was administered. The fumigating powder he used was calomel washed in water containing a small quantity of ammonia, so that the powder may be deprived of its muriatic acid and assume a darker grey colour. No improvement on this method has been advanced up to the present day, and I think we are now, pretty well all of us, of opinion that if mercury is to be administered at all in specific disease it is best administered by fumigation. That, at any rate, is my experience, and I never think of using any other method.

INJURIES OF THE HEAD.

I look upon an essay by Abernethy on "Injuries of the Head" as replete with practical wisdom. He maintained that the older surgeons certainly trephined unnecessarily in consequence of their belief that the brain was an organ of so delicate a structure that the least degree of pressure would be highly injurious; whilst others, from having witnessed the frequent ill-success of the operation, and from having observed that many patients recovered unexpectedly when it was omitted, seemed inclined too generally to reprobate the practice. Under these circumstances it appeared proper to show what kind of cases would probably do well without having recourse to it, and he gives a series of most remarkable illustrations with the argument that it is often very useful to postpone the operation until after the subsidence of any inflammatory symptoms, even though the structure of the brain be injured by the accident. The whole of the essay, including one

hundred and thirty-two pages, would well bear republication.

ILL-CONSEQUENCES FOLLOWING VENESECTION.

Abernethy had an unhesitating belief in venesection as a remedy, and the extent to which he bled would, I think, have brought him up for malpractice now. At the same time he was careful in pointing out the ill-consequences which sometimes succeed to venesection, and which he had seen. He placed the dangers under the following heads:—

(1) Inflammation of the integuments and subjacent cellular substances. (2) Inflammation of the absorbing vessels. (3) Inflammation of the vein. (4) Inflammation of the fascia of the forearm. (5) Ill-consequences succeeding to a wounded nerve.

CLASSIFICATION OF TUMOURS.

Abernethy's classification of tumours has been considered ever since its appearance, as the sound foundation of this subject. He tells us that in attempting a classification of tumours he supposes that they may be made to constitute an order in the class of diseases in nosology, and the meaning of the word may be restricted to substances of new formation which made no part in the original structure of the body. The order may then be divided into genera, and the first may be denominated, from having a firm, fleshy feel, Sarcoma, or Sarcomatous Tumours.

The order of sarcomatous tumours contains many species, the *first* of which he treats as being apparently composed of the coagulable part of the blood, rendered generally vascular by the growth of vessels through

it without having any noticeable peculiarity in their distribution. These tumours may be called *common vascular*, or *organised sarcoma*. A *second* species, found frequently in the fore or back part of the trunk of the body, are enclosed always in a thin capsule of common cellular substance, and are called by him *adipose sarcoma*. Although they are made up of adipose, or fatty substances, with some but not numerous vessels, he conceives that in the first instance they are formed of coagulable lymph rendered vascular by the growth of vessels into it. He narrates that he has seen an abscess form in the substance of an adipose tumour with earthy matter deposited on the sides of the cavity. He had also seen osseous matter deposited within the substance of an adipose tumour. The *third* species of this genus he designates as *pancreatic sarcoma*, as the tumour resembles the pancreas in appearance. He considers that it occurs most frequently in the female breast, perhaps originating in the lymphatic glands. The *fourth* species he calls *cystic sarcoma*, a tumour more frequently met with in the testes and ovary. The mass consists of a congeries of cells containing a serous fluid, the sides of the cyst so vascular as to be made red by injection. In this kind of cyst is found sometimes a caseous substance which resembles cheese in consistency. A *fifth* species he denominated *mammary sarcoma*, because it so closely resembles the mammary gland in colour and texture. The *sixth* species he named *tuberculated sarcoma*; it consists of an aggregation of small, firm, roundish tumours of different sizes and colours connected together by a kind of cellular substance; the size of the tubercles is from that of a pea to that of a horse-bean; the colour of a brownish red, and some of a yellowish

tint. The *seventh* he defines as *pulpy*, or sarcoma generally found in the testes, and before his time usually distinguished by the name of soft cancer; but the term cancer is objectionable because it conveys an erroneous idea of its nature. The *eighth* species of sarcomatous tumour he defines as the *carcinomatous* tumour. This, on account of its peculiar hardness, is emphatically called *schirrus*, while it remains entire and free from ulceration.

He observed, after Mr. Hunter, that a disposition to cancer exists in the surrounding parts prior to the actual occurrence of the diseased action, a fact which led to the rule in practice that a surgeon ought not to be contented with removing actually the diseased part. He held that cancer, like most other local diseases, owes its origin to a disordered state of the health in general; that is to say, there is a predisposition to cancer. He thought also, with Mr. Hunter, that cancer is so far local that if all the diseased part, or that which is so contiguous to it as to have felt its influence, were removed, the patient would be as exempt from cancer in that part as if it had never occurred; but he opined that, though this be true, the state of constitution which induces the disease originally may, after a certain lapse of time, cause the disease to recur. He differentiated other tumours by their regularity of surface and shape and a pulpy feel, cysts most frequently composed of many lamellæ. They sometimes adhere most tenaciously to the contiguous parts, and the interior surface secretes the contents found in the cysts. Some notions have been entertained that these cysts may be of the nature of hydatids. They are commonly called *wens*, and their contents have been denominated steatomatous, athero-

matous, and emiliceritous, but occasionally they secrete a substance like nail or horn.

Another genus of tumours to which he referred were the *osseous* tumours, and he maintained that vascular tumours may become converted into a substance resembling cartilage.

THE THEORY OF LIFE.

Mr. Abernethy was a great admirer of Hunter, and may indeed be considered as one of his most ardent, as well as immediate, followers. Like Hunter, he was often contradictory in the statements which he put forward, and in the use he made of the word "life"; but, setting aside a certain measure of obscurity which those who read carefully will find in the works of Hunter himself, he was considerably in advance of his time, and perhaps of our time, on the question of living motion and the influence of the subtle principle to which he gives the name of "life." Abernethy taught that in surveying the great chain of living beings life is found connected with a vast variety of organisation, yet exercising the same functions in each circumstance, from which we may naturally conclude that life does not depend on organisation. It seems to me as if he looked upon life as something essentially independent, as pervading the surface of the planet, and as exercising in itself and by its presence certain distinctive powers. He quotes Hunter to explain that in speaking of the properties of life we speak of something that prevents the chemical decomposition to which most animal matter is so prone; of something which regulates the temperature of the bodies it inhabits, and of something that is the cause

of the actions we observe in living bodies. All these circumstances, though deduced from an extensive contemplation of the subject, may be legitimately drawn from observations made on the egg. A living egg does not putrefy under circumstances that would rapidly cause putrefaction in a dead one. The living egg resists a degree of cold that would freeze the dead one, and when the fresh egg is subjected to the genial warmth of incubation the matter of it begins "to move," or "to be moved"—the difference of the verb from the active to the passive voice is worthy of remark—so as to build up the curious structure of the young animal.

Touching on the way this subject had been discussed by various authors, Abernethy was rather severe. "Many persons," he says, "have genius without industry; others have industry without genius; while many who have both are still deficient in judgment." Hunter, he seemed to think, had both industry, genius, and judgment, so that his thoughts have "probability, rationality, and theory," especially when the subject of irritability is discussed. On the subject of muscular motion he taught that muscular contraction is primarily due to the effect of chemical change occurring in a part; secondly, that contraction of irritability is a property of muscular fibre; thirdly, still on Hunterian projection, that irritability is the effect of some subtle, mobile, invisible substance, superadded to the evident structure of muscles, or other forms of animal and vegetable matter; as magnetism is to iron, and as electricity is to various substances with which it is connected. In magnetic and electric motions a subtle invisible substance of a very quickly and powerfully mobile nature puts in motion other bodies which are

evident to the senses, and are of a nature grosser and more inert.

On the theory of irritability he is as convinced as we now are that electricity pervades all nature. Life, in short, "inheres" in vegetables and animals, and as the motions of electricity are characterised by their celerity and force, so are the motions of irritability. The motions of electricity are vibratory; so likewise are those of irritability. When by long-continued exertion the power of muscles is fatigued, or when it is feeble, the vibratory or tremulous motions of muscle are manifest to common observation, but the same kind of motion may be perceived at all times by attention.

In a really elegant and enthusiastic passage he endeavoured to point out, on Hunterian doctrine, how matter, starting from the general mass, springs into life in vegetation. He showed how electricity is sufficient to produce great physical changes in inert matter without the intervention of human assistance, and he therefore infers that when we perceive in the universe at large the cause of rapid and powerful motions of masses of inert matter we may naturally conclude that the inert molecules of vegetable and animal matter may be made to move in a similar manner by a similar cause. At the same time he was careful to guard himself against declaring that change from dead animal and vegetable matter to living is proved as being induced by electricity. He inclined rather to an *anima mundi* as the unknown widely spread factor.

Turning to a kindred subject, Abernethy believed that all sensation is in the brain, and that all volition proceeds from the brain. He argued, first, that if the continuity of a nerve be intercepted at any point

between that extremity which receives impressions from the objects of sense and which may therefore be called the impressible or tangible extremity, and that which communicates with the brain and is usually called its sensorial extremity, both feeling and volition by means of that nerve are suspended. Secondly, he was of opinion that if a certain degree of pressure be made upon the brain, both feeling and voluntary motion cease whilst the pressure continues, and return when it is removed. Thirdly, as we have evidence that the perceptions and intellects of animals increase in proportion as the brain becomes larger and more complex, so we have reason to conclude that these faculties are connected with the brain. Fourthly, the conviction which we generally, though not constantly, experience, that feeling exists in the part which receives impression, is a deceptive conviction, as proved by the following "facts." If a nerve be irritated between the brain and its extremities, severe pain is supposed to be felt in those extremities; and if it supplies muscles, those muscles become convulsed, a fact which proves that motions excited in the middle of the nerves are transmitted to the brain, and from thence to the parts where the effects are determinable. Fifthly, Mr. Abernethy urged that motion does not necessarily imply sensation, because motion takes place where no one yet imagined that sensation could take place, a point he tried to illustrate by comparing the act of crystallisation, which begins from a point touched, and rapidly and regularly pervades the liquor of a saturated solution, till the whole assumes a solid form. Here he became obscure, desiring, as it seems to me, to show that extensive inflammation of surface partakes of the same physical character as crystallisation. Candidly, I cannot follow

him, but the fault may be mine, or it may be a want of perspicuity of expression on his part, for he was not a good writer. He preferred too frequently to use pronouns instead of repeating nouns, a fearful literary error.

LOCAL AND CONSTITUTIONAL DISEASE.

The volumes which brought Mr. Abernethy into greatest repute were those on the constitutional origin of local diseases. These works were very much appreciated by the public, and deservedly so, but amongst some members of the profession they created a feeling of criticism and dislike. It is impossible, says one of his admirers, not to admit that there is sometimes a degree of crudity in his performances which is neither consistent with his large advantages nor the length of time he has appeared as an author. A leading chapter in his work bears on the disorders of the system in general, and of the digestive system in particular, which accompany local disease, whether they be sympathetic or idiopathic. He insisted that the effects of local disorders on the constitution had been too little attended to, and urged that the reciprocal operation of constitutional disorders upon local diseases had obtained still less attention. He thereupon followed up with illustrations, showing from cases he had observed to what extent these two considerations deserve more study from the learned. He dwelt very much on errors of digestion as leading to local affections, and defined, often excellently well, the difference between what he called disorder and disease; disorder being the derangement which leads to disease. He wrote at great length on the digestive process, and was extremely insistent on the relation of disorders of the digestive

function in connection with various nervous and muscular diseases. There can be no doubt that he occasionally met with cases of supposed incurable local diseases like paralysis, which did depend on mere derangement of the alimentary canal, and as I study this part of his work I have learned many useful hints and principles from it bearing on this point. I find, for example, the following passage, which is very good, and worthy of remembrance in this day :—

“The reciprocal sympathy which exists between the brain and the digestive organs is generally admitted, but the kind, and the degree of the effects arising from this sympathy is not, perhaps, in general, sufficiently understood. These organs mutually increase each other’s disorder till the affection of the sensorium leads to the greatest disturbances of the nervous functions, and even those of the mind.”

He considered that apoplexy may occur from stomachic disorder, and that the perfect recovery of patients which sometimes happens after stomachic disorders may also be considered as additional evidence of there having been in such instances no organic disease of the brain. He held the same view in regard to certain cases of epilepsy, and he added :—

“Now, if disorder of the digestive organs is capable of causing or aggravating nervous disorder, even to the production of those effects which have been mentioned, when there is no alteration of structure, it will be granted that such a state of irritation of the sensorium may lay the foundation of an excitement of the vascular structure of the brain, and thus very frequently produce organic disease. When this has occurred it will aggravate and establish the nervous affection, and thus perhaps render it insusceptible of cure.”

There is so much of sound common sense in many of Abernethy's remarks on the constitutional origin of local disease that I cannot avoid recalling some of them.

FALSE DIVISIONS OF THE HEALING ART.

"An evil seems to have arisen from the artificial division of the healing art into the medical and surgical departments. This division has caused the attention of the physician and the surgeon to be too exclusively directed to those diseases which custom has arbitrarily allotted to their care. The effects of local disorders upon the constitution have, in consequence, been too little attended to; and, indeed, there is no book to which a surgical student can be referred for a satisfactory account of those febrile and nervous affections which local disease produces, except that of Mr. Hunter. The reciprocal operation of constitutional disorders upon local diseases has obtained still less attention. To investigate more particularly some parts of these subjects, and to submit them to public notice, are the proposed objects of the present paper"—a paper on the constitutional origin of local disease.

UNIVERSAL SYMPATHY.

"No part of the animal body can in general be very considerably disordered without occasioning a correspondent derangement in other parts of the system. Such disorder has been considered by Mr. Hunter as the result of universal sympathy. This consent of the whole constitution with its parts manifests itself, in particular instances, by a greater disturbance of the functions of some organs than of others; and from this circumstance diseases have derived the appellations by

which they are commonly distinguished. If the actions of the sanguiferous system be principally disturbed, and the temperature of the body subject to unusual variations, the disease is termed fever; if the nervous system be chiefly affected, a state of vigilance or of delirium may be produced; while convulsions and tetanus take place when the functions of the muscular system are more particularly deranged. Though the disorder of particular organs thus gives a character and denomination to the disease, it is sufficiently evident, in instances adduced, that the whole constitution is disturbed; while certain parts are chiefly affected, perhaps from unknown circumstances relative to the nervous system, or from a predisposition to disorder existing in the affected parts. It seems to be ascertained that persons of particular constitutions are predisposed to those febrile actions of the sanguiferous system which constitute the inflammatory fever; that there is a propensity to convulsions in children, and to tetanus in the inhabitants of warm climates."

DIGESTIVE FAILURES.

"In a perfectly healthy state of the digestive organs," he continues, "probably no chemical decomposition, even of the fæces, takes place; yet such changes happen, in some degree, without apparently producing any injurious consequences. To chemical changes we may probably attribute the extrication of inflammable air, and the various and unnatural odours of the fæcal matter, which are observable in disordered states of the digestive viscera."

In continuation of the same argument he explains:—

"It is a principal object of medicine to give strength and tranquillity to the system at large, which must

have a beneficial influence on all its parts, and greatly promote the well-doing of every local disease. We cannot reasonably expect tranquillity of the nervous system whilst there is disorder of the digestive organs. As we can perceive no permanent source of strength but from the digestion of our food, it becomes important on this account that we should attend to its quantity, quality, and the periods of taking it, with a view to ensure its perfect digestion."

FOODS AND FEEDING.—QUANTITY.

"First, with respect to quantity: there can be no advantage in putting more food into the stomach than it is competent to digest, for the surplus can never afford nourishment to the body; on the contrary, it will be productive of evils. Being in a warm and moist place, the undigested food will undergo those chemical changes natural to dead vegetable and animal matter: the vegetable food will ferment and become acid, the animal will grow rancid and putrid; this is only rendered evident occasionally when a disordered stomach rejects some of its contents; then the teeth are roughened and set on edge by the corrosive qualities of the acid, and the throat feels burnt by the acrimony of the rancid oil. These effects, though occasionally made apparent, must constantly take place, unless by the digestive powers of the stomach the food is converted into a new substance which is not liable to these chemical changes. Such new and irritating compounds may not, indeed, materially injure a healthy stomach, but cannot fail to be detrimental to one that is weak and irritable, as well as to the tract of the alimentary canal, and thus maintain and aggravate its disorder. Part of the food thus changed will be

imbibed from the bowels and render the blood impure, from which there is no outlet for various kinds of matter but through the kidneys, and this may prove a cause of foul urine, as well as of the presence of many substances in that fluid not natural to it, and be productive of serious diseases in the urinary organs. Observing the evils resulting from undigested aliment, we surely ought to guard against them by proportioning the quantity of our food to the digestive powers. Nature seems to have formed animals to live and enjoy health upon a scanty and precarious supply of food; but man in civilised society, having food always at command, and finding gratification from its taste, and a temporary hilarity and energy result from the excitement of his stomach, which he can at pleasure produce, eats and drinks an enormous deal more than is necessary for his wants or welfare; he fills his stomach and bowels with food which actually putrefies in those organs; he fills also his blood-vessels till he oppresses them, and induces diseases in them as well as in his heart. If his digestion be imperfect he fills them with unassimilated substances from which nutriment cannot be drawn, and which must be injurious. In proportion as the powers of the stomach are weak, so ought we to diminish the quantity of our food, and take care that it should be as nutritive and easy of digestion as possible. By adopting an abstinent plan of diet even to a degree that produces a sensation of want in the system, we do that which is most likely to create appetite and increase the powers of digestion. In how great a degree want effects these objects, is evident in those who have been obliged to fast from necessity, or have been much reduced by hæmorrhage."

QUALITY OF FOODS.

“Secondly, as to quality. When the stomach is weak, it seems particularly necessary that food should be nutritive and easy of digestion. Its qualities should be adapted to the feelings of the stomach. In proof of this proposition numerous instances might be mentioned of apparently unfit substances agreeing with the stomach, being digested, and even quieting an irritable state of stomach merely because they were suitable to its feelings. Instances might also be mentioned of changes in diet producing a tranquil and healthy state of stomach in cases where medicines have been tried in vain. Neither can such occurrences excite surprise, for as digestion and the consequent tranquillity of the stomach depends on a proper quantity of healthy juices being secreted and commixed with the food, such secretions are likely to be produced by whatever agreeably excites it, and obstructed by whatever has a contrary tendency.”

TIMES FOR FOOD.

“Thirdly, as to the times of taking food. It is evidently the intention of nature that we should put into the stomach a certain portion of food, the excitement of which, inducing a secretion of gastric fluid by its action, becomes digested. This office of the stomach being effected, it should be left in a state of repose till its powers are restored and accumulated, and this return of energy would in health be denoted by a return of appetite. It is probable that three hours may elapse in health before digestion of a moderate meal is effected, so that the stomach is empty and in a state of repose. It is therefore reasonable to allot the same portion of

time for the same purpose when the organ is disordered, whilst we have diminished the quantity of our food in order to proportion it to the diminished powers of the organ; yet instead of pursuing this rational plan of diet, many persons are taking food every third or fourth hour, pleading in excuse for such conduct that they cannot do without it. The truth is, that when the stomach is disordered the exertion of digesting a single meal after its excitement and efforts have ceased, is productive of languor, sinking, and inquietude, which ought to be calmed or counteracted by medicines and not by food, for a second meal cannot be digested in this state of the stomach. We also often tease and disorder our stomachs by fasting for too long a period; and when we have thus brought on what may be called a discontented state of the organ, unfitting it for its office, we sit to a meal, and fill it to its utmost, regardless of its powers or its feelings. The rules, then, for diet may be thus summarily expressed: we should proportion the quantity of food to the powers of the stomach, adapt its quality to the feelings of the organ, and take it at regular intervals of six or seven hours thrice during the day."

WATER THE ONE NATURAL DRINK.

"Everything which we take into the stomach, except food, may be considered in two points of view; either as a diluent or a medicine. Water is the only diluent, and we are in the habit of mixing alimentary matter and stimulants with it. Diluents probably ought not to be taken during or immediately after our meals, since they would be likely to render the juices of the stomach less efficacious in the digestion of our food. Hunger

and thirst seem to be incompatible sensations : a hungry animal would eat to satiety, and the stimulus of the food would bring on a discharge of the juices of the stomach which have the power of digesting the food ; and it is not probable that the sensation of thirst would be experienced till this operation of the stomach is effected. If the sensation of thirst then occurred, water would appease it, without frustrating the digestive functions; and, being absorbed from the alimentary canal, a certain portion of it would be furnished to the blood, and the surplus would pass off from the skin, lungs, and kidneys. All stimulants must be regarded as medicines; vinous liquors are of this class, and, being suitable to the feelings of the stomach, are in many cases very efficacious, yet they are liable quickly to pass into a state of acetous fermentation, and to provoke that change in the remaining quantity of the vegetable matter contained in a disordered stomach, and thus produce a strong and injurious acid. The rule for taking vinous liquors in persons to whom habit has rendered them necessary, may be thus briefly stated. They should not take them during their meals, lest the temporary excitement they produce should induce them to take more food than the powers of the stomach are capable of digesting ; but, afterwards they may be allowed so much of them as may be required to induce agreeable feelings, or, to express the fact more clearly, as is necessary to prevent those uncomfortable sensations which the want of them may occasion ; and it may be added, the less they take the better. People deceive themselves on this point. A disordered stomach will feel uncomfortable after eating ; fermented liquors will remove for a time the unpleasant sensations. Potion after potion is swallowed on this account ; often with-

out producing permanent tranquillity, and much to the injury of the stomach. Wine drinkers do not drink wine after every meal, which proves that wine is not necessary to their digestion ; and many who have confided in this belief have been convinced of their error by leaving it off and finding that they digested their food as well when deprived of it, and that such privation greatly contributed to their eventual restoration to health. When stimulants seem requisite and fermented liquors run into the acetous fermentation in the stomach, spicy and aromatic vegetables should be substituted, such as ginger, pepper, and mustard."

MISCELLANEOUS ESSAYS.

There are several other essays by Abernethy which in their time very much influenced the medical and surgical world. An essay on perforating the distended bladder above the pubis in cases of distention was one of these. A modification of his plan of perforating lumbar abscess in several places is another. An interesting account of the effect of opening the chest wall in some cases of emphysema may be read still with profit ; his hypothesis of the uses of the Foramina Thebesii of the heart, discovered by Thebesius and bearing his name, is ingenious ; his description of a contraction in the opening between the right auricle and right ventricle of the heart, and of other instances of that function of the body, are worthy of record, as is his account of a fungus of the antrum which, evolving upon the cheek, sloughed away during a fever, and did not return, but was followed by exostosis. Natural history is indebted to him for particulars on the anatomy of the whale, especially in reference to the arrangement

of the lacteals in that mammal. And, that he did not despise general literature is shown by the fact that he wrote articles for Rees' "Cyclopædia" and other general works; but it cannot be said that he shone as a writer.

A rather singular controversial point sprang up between Abernethy and an able cotemporary of his, Dr. Lamb. Many years ago a descendant of Dr. Lamb, daughter or granddaughter, did me the honour to submit to me the works of Dr. Lamb, under the idea that he was being too speedily forgotten. I agreed with her, for after perusing his work I could not fail to discern that Lamb was a man of rich attainments and of original mind. He was practically the founder of the new vegetarian system of diet, and, I may almost say, he was the first to indicate that some acute diseases, such as cholera and diarrhœa, spring from the drinking of bad water.

Among other ideas of this enthusiastic man, Dr. Lamb, was one to the effect that cancer is preventible and even curable by the plan of drinking distilled water. He brought a case before Abernethy treated on the method, and seemed afterwards to imply that Abernethy took credit to himself for the idea. Abernethy does not appear to have repudiated fully the charge, and so the matter rests.

PERSONAL CHARACTERISTICS OF ABERNETHY.

I have shown already how strangely Abernethy has influenced the popular mind. It was not only as a surgeon but as a man and as a physician that it was true. He is one who has flourished on in his oddities, some say on his vulgarities. There is a difference of opinion on this point. Sir Richard Owen told me that

the statements concerning him were often grossly exaggerated, and Dr. Robert Willis, who knew him intimately, expressed to me that I must take everything said against him *cum grano salis*; that a more kindly disposed man did not exist; and, that without him the magnificent library of the Royal College of Surgeons would never have been established. On the other hand, Pettigrew, who also knew him and admired him much, gives him a sad character for rudeness and uncouth demeanour. Pettigrew tells a number of anecdotes bearing on this subject; to wit:—

A man of rank consulted Mr. Abernethy, and was received by him with remarkable rudeness. Upon some severe remark being made, the patient lost his temper, and told Mr. Abernethy he would make him eat his words. “It will be of no use,” said Mr. Abernethy coolly, “for they will be sure to come up again.”

“Pray, Mr. Abernethy, what is a cure for gout?” was the question of an indolent and luxurious citizen. “Live upon sixpence a day—and earn it,” was the reply.

He is reported as being consulted by the Duke of York of his day; he stood before his Royal Highness, whistling, with his hands in his breeches pockets as usual. The duke, astonished at this conduct, said, “I suppose you know who I am?” “Suppose I do,” said he; “what of that?” And his advice to his Royal Highness was given thus: “Cut off the *supplies*, as the Duke of Wellington did in his campaigns, and the enemy will leave the citadel.”

A barrister had a small ulcer on the leg which was difficult to heal, and he determined to apply to Mr. Abernethy. Aware of his impatience and eccentricity, he, immediately upon entering the room, began to pull

down his stocking. "Holloa! holloa! what the devil are you at?" said the surgeon. "I don't want to see your leg; that will do—put it up, put it up." The patient did so; but, justly dissatisfied with the imperfect manner in which his case had been considered, instead of the usual fee, placed a shilling only upon the table. "What is this?" said Mr. Abernethy. "Oh," replied the barrister, "that will do—put it up, put it up," and coolly walked away.

"The Count was wounded in the arm: the bullet had sunk deep into the flesh; it was, however, extracted, and he is now in a fair way to recovery.' That will do very well for a novel, but it won't do for us, gentlemen,"—Abernethy's pupils.

"Sir Ralph Abercrombie received a ball in the thick part of his thigh, and it buried itself deep, deep; and it got among important parts, and it couldn't be felt; but the surgeons, nothing daunted, groped, and groped, and groped,—and Sir Ralph died"—to the same.*

* I am indebted to an old friend, Miss Walker of Whittington, for a glance at an album, once belonging to a deceased relative, of the date of Abernethy's death, in which is inserted the MS. of a droll poem, dealing—as was common at the time—with many of his eccentricities of speech. One dyspeptic patient is advised:—

"Not to eat either tongs, poker, or bellows;
Poker and tongs too hard you'll find,
Bellows would fill you up with wind.
'May I eat oysters, sir?' 'Yes! Well!'
'And what besides?' 'Why, eat the shell.'"

To another patient:—

"Said Abernethy, 'Buy my book,
At pages four and seven look.'"

A third, who objected to a shower bath, was recommended:—

"To take an umbrella first."

The next time:—

"You'll only need a parasol."

To a lady who complained that she was:—

"All over pains inside and out':
'Yes, like a window, ma'am, no doubt.'"

It is not necessary to dwell longer on the peculiarities of John Abernethy; of his habit of thinking aloud; of speaking to his students, who adored him, in irrelevant, interjectory manner; of his petulancy, his impulse, and his wish in all he did to rule. He had many faults: on that point there can be no mistake; but he had also many virtues. He was frank, open, decisive, observant. His jokes even extended to himself, as when he said of his own œdematous limbs, "Why, I am better on my legs than ever; you see how much stouter they are."

We turn to his portrait and we see the individual, a fine face with a steady cynicism of expression and sly laugh—a comic face, in fact, with humour in it not concealed. There are several very good portraits of him, besides that which I have given in this ASCLEPIAD

A lady who had pains in the arm was told:—

"'Pooh! nonsense! if it hurts your arm,
The more fool you to raise it, ma'am.'"

An old farmer from the fens, who narrated his daily diet, was dismissed with the criticism:—

"'What, nothing more? six meals at least;
Six meals a day! a perfect beast!'"

A son of Mars was introduced and advised to:—

"'Roll from the window to the door
And back again upon the floor.'
'And what besides, sir?' 'Nothing more;
Good-morning! please to shut the door.'"

A patient, rather annoyed by his abruptness, was equally abrupt in avoiding to pay the fee. But a lady who visited him, knowing his peculiarities, saying nothing to him, presented her thumb for his inspection. "Cut?" "No, bite." "Dog?" "No, parrot." "Shut it up and return next Wednesday." She returned in silence. "Better?" "No, worse." "Put on a poultice and come again." A final visit followed, once more in silence. "Worse?" "No, well." Then the moral:—

"'No pain then?' 'No, not e'en a tingle.'
'Sensible woman, would that I were single!'"

(that probably either by Dance or Daniel), including one by Sir Thomas Lawrence in St. Bartholomew's Hospital; Mr. Le Cheminant, of Wigmore Street, possesses also an excellent miniature, which strikingly supplies the humorous expression.

Mr. Abernethy did not rank with long-lived men. Before his sixty-sixth year he had not only retired from the hospital, but had altogether given up practice and had withdrawn to Enfield, at that time a very famous place of resort. There he suffered a prolonged illness, in which, probably, the heart was most affected, together with the kidneys. He became dropsical, and passed away on April 20th, 1831, in his sixty-sixth year.

In the medical firmament Abernethy was not a star of the first magnitude, and his peculiarities, upon which he seems to have prided himself, did not tend to his lasting fame. His students, nevertheless, looked on him with the utmost pride, as well they might, for he was an industrious, earnest, and friendly teacher. For them he founded, at St. Bartholomew's, the Medical and Philosophical Society, which, immediately after his death, was changed to that "Abernethian Society," the centenary of which, as stated at the opening of this paper, was lately celebrated with a display of enthusiasm Hippocrates himself might have envied, could he have forecast his fate in the future history of his art

FOUNTAINS OF MEDICAL SCIENCE AND ART.

CICERO ON OLD AGE AND AFFAIRS OF LIFE.

“**W**HEN,” remarks Cicero, “I consider the several causes which are supposed to constitute the infelicities of old age, they may be included under four general articles. In the first place, it is alleged that it incapacitates a man for acting in the affairs of the world; in the next, that it produces great infirmities of body; thirdly, that it disqualifies him for the enjoyment of the sensual gratifications; and lastly, that it brings him within the immediate verge of death. Let us, therefore, if you please, examine the force and validity of the first of these particular charges.

“‘Old age,’ it seems, ‘disqualifies us from taking an active part in the great scenes of business.’ But in what scenes? let me ask: if in those which require the strength and vivacity of youth, I readily admit the charge. But are there no other—none which are peculiarly appropriated to the evening of life, and which, being executed by the powers of the mind, are perfectly consistent with a less vigorous state of body? Did Quintus Maximus then pass the latter end of his long life in total inactivity? Tell me, Scipio, was *your* father, and my son’s father-in-law, the excellent

Lucius Paulus; were the Fabricii, the Curii, and the Coruncanii, utterly bereaved of all useful energy, when they supported the interests of the republic by the wisdom of their counsels and the influence of their respectable authority? Appius Claudius was not only old, but blind, when he remonstrated in the Senate, with so much force and spirit, against concluding a peace with Pyrrhus, to which the majority of the members appeared strongly inclined. And upon this occasion it was that he broke forth into those animated expostulations which Ennius has introduced into his poem,

“ ‘ Shall folly now that honour'd council sway,

Where sacred wisdom wished to point the way ?’

together with the rest of those inspired lines, with which you are no doubt well acquainted. This celebrated harangue, which is still extant, Appius delivered seventeen years after his second consulate, between which and his first there was an interval of ten years; and prior to both he had exercised the office of Censor. It is evident, therefore, that he must have been a very old man at the time of the Pyrrhic war; and indeed the tradition received from our forefathers has always represented him as such.

“ It appears, therefore, that nothing can be more void of foundation than to assert that old age necessarily disqualifies a man from engaging in the great affairs of the world. As well might it be affirmed that the pilot is totally useless and unengaged in the business of the ship, because while the rest of the crew are more actively employed in their respective departments, he sits quietly at the helm and directs its motions. If in the great scenes of business an old man cannot perform a part which requires the force and energy of

vigorous years, he can act, however, in a nobler and more important character. It is not by exertions of corporal strength and activity that the momentous affairs of state are conducted; it is by cool deliberation, by prudent counsel, and by that authoritative influence which ever attends on public esteem—qualifications which are so far from being impaired that they are usually strengthened and improved by increase of years. And in this opinion, my noble friends, I am persuaded I shall have your concurrence; unless, peradventure, you look upon me as a useless and idle member of the commonwealth, because after having regularly passed through the several gradations of military service, from the private soldier to the commander-in-chief, actively concerned in each of these capacities in a variety of engagements both by sea and land, I now no longer lead forth our armies to battle. But if I forbear to enter personally into the fatigues of war, I represent to the Senate its most proper object, and point out in what manner the operations may best be carried on. In short, I am perpetually urging the expediency of declaring war against the Carthaginians, in order to anticipate them in those hostilities which they have long been meditating against us: as, in truth, I shall never cease to be apprehensive of that commonwealth, till it shall no longer have any existence. And may the glory of extirpating that insidious state be reserved, Scipio, for your arms! that you may have the honour of accomplishing the great work which your illustrious ancestor so happily began! Thirty-three years have now elapsed since the death of that great man; but his virtues are still fresh in the minds of his fellow-citizens, and will be had in perpetual remembrance throughout all succeeding generations. His death

happened the year before I was elected Censor, and nine years after his second consulate, in which office he was chosen my colleague. But had the life of this excellent man been extended even through a whole century, can it be imagined that he would have considered the closing period of such honourable days as a state to be regretted? For it was not agility in the robust and manly exercises, or skill and prowess in the management of arms; it was his judgment, his counsel, and his authority alone, which he would then have had occasion to display. The truth is, if abilities of this latter kind were not the peculiar attributes of old age, our wise ancestors would not, surely, have distinguished the supreme council of the state by the appellation of Senate. The Lacedæmonians, for the same reason, give to the first magistrates in their commonwealth the title of Elders; and, in fact, they are always chosen out of that class of men.

“If you look into the history of foreign nations, you will find frequent instances of flourishing communities which, after having been well-nigh ruined by the impetuous measures of young and inexperienced statesmen, have been restored to their former glory by the prudent administration of men of more discreet years. ‘Tell me,’ says one of the personages in a play of Nævius, addressing himself to a citizen of a certain republic—‘tell me whence it happened that so considerable a state as yours has thus suddenly fallen into decay?’ The person questioned assigns several reasons, but the principal, ‘that a swarm of rash, unpractised young orators had unhappily broken forth and taken the lead among them.’ Temerity indeed is the usual characteristic of youth, as prudence is of old age.

“But it is further urged ‘that old age impairs the

memory.' This effect, I confess, it may probably have on those memories which were originally infirm, or whose native vigour has not been preserved by proper exercise. But is there any reason to suppose that Themistocles, who had so strong a memory that he knew the name of every citizen in the commonwealth, lost this retentive power as his years increased, and addressed Aristides, for instance, by the appellation of Lysimachus? For my own part, I still perfectly well recollect the names, not only of all our principal citizens now living, but of their ancestors also; and I am so little apprehensive of injuring this faculty (as is vulgarly believed) by the perusal of sepulchral inscriptions, that, on the contrary, I find them of singular service in recalling to my mind those persons whom death hath long since removed from the world. The truth is, I never heard yet of any veteran whose memory was so weakened by time as to forget where he had concealed his treasure. The aged indeed seem to be at no loss in remembering whatever is the principal object of their attention; and few there are at that period of life who cannot readily call to mind what recognisances they have entered into, or with whom they have had any pecuniary transactions. Innumerable instances of a strong memory in advanced years might be produced from among our celebrated lawyers, pontiffs, augurs, and philosophers; for the faculties of the mind will preserve their powers in old age, unless they are suffered to lose their energy and become languid for want of due cultivation. And the truth of this observation may be confirmed, not only by those examples I have mentioned from the more active and splendid stations of the world, but from instances equally frequent to be met with in the paths of studious

and retired life. Sophocles continued in extreme old age to write tragedies. As he seemed to neglect his family affairs whilst he was wholly intent on his dramatic compositions, his sons instituted a suit against him in a court of judicature; suggesting that his understanding was impaired, and praying that he might be removed from the management of his estate; agreeably to a custom which prevails likewise in our own country, where, if a father of a family by imprudent conduct is ruining his fortunes, the magistrate commonly interposes and takes the administration out of his hands. It is said that when the old bard appeared in court upon this occasion, he desired that he might be permitted to read a play which he had lately finished, and which he then held in his hand; it was his *Œdipus in Colonis*. His request being granted, after he had finished the recital he appealed to the judges whether they could discover in his performance any symptom of an insane mind? and the result was that the court unanimously dismissed the complainants' petition. Did length of days weaken the powers of Homer, Hesiod, or Simonides; or of Stesichorus, Isocrates, or Gorgias? Did old age interrupt the studies of those first and most distinguished of the Greek philosophers, Pythagoras or Democritus, Plato or Xenocrates? or, to descend into latest times, did grey hairs prove an obstacle to the philosophic pursuits of Zeno, Cleanthes, or that famous Stoic whom you may remember to have seen in Rome, the venerable Diogenes? On the contrary, did not each of these eminent persons persevere in their respective studies, with unbroken spirit, to the last moment of their extended lives?

“But not to enter further into the consideration of old age in respect to the nobler and more exalted applica-

tion of the human faculties, I could name among my friends and neighbours in the country several men far advanced in life who employ themselves with so much industry and activity in the business of agriculture, that they never suffer any of the more important processes of their husbandry to be carried on when they are not themselves present to supervise and direct the work. I will acknowledge at the same time that these spirited labours of the persons I allude to are not, perhaps, a matter of much wonder with regard to those objects of tillage which are sown and reaped within the year ; as no man is so far advanced in age, as not to flatter himself that he may at least survive to enjoy the benefit of the next harvest. But those rural veterans I am speaking of are occupied also in branches of husbandry from which they are sure that they themselves cannot possibly live to derive the least advantage.

“ ‘ The future shade for time unborn they raise,’

as my friend Cæcilius expresses it, in his play called *The Youthful Companions*. Agreeably to this generous and distinguished principle, the oldest husbandman, when he is asked ‘ to what purpose he lays out his labours in the business of planting ? ’ may well reply, ‘ In obedience to the immortal Gods ; by whose bountiful providence as I received these fields from my ancestors, so it is their will that I should deliver them down with improvement to posterity.’

“ The poet’s sentiment in the verse I just now repeated is far more just than in those lines he afterwards adds—

“ ‘ Severe the doom that length of days impose !
To stand sad witness of unnumbered woes.
Ah ! had old age no other ills in store,
Too well might man its dire approach deplore ’ ;

for if long life may occasion our being the painful spectators of many calamities which an earlier death would have concealed from our view, it may equally afford us the satisfaction of seeing many happy events which could not otherwise have come within our notice: not to mention that disagreeable scenes will unavoidably occur to the young, no less than to the old. But the observation of my dramatic friend is still more unwarrantable, when he further declares that

“‘Of all the ills the drooping old await,
’Tis sure the worst to stand the scorn or hate
Of happier years.’

Why should he suppose that old age necessarily lays us open to a mortification of this kind? The fact is, on the one hand, as men of good sense in the evening of life are generally fond of associating with the younger part of the world, when they discover in them the marks of an amiable disposition, finding a sort of alleviation of their infirmities in gaining their affection and esteem; so, on the other, well-inclined young men think themselves equally happy to be conducted into the paths of knowledge and virtue by the guidance and instruction of experienced age. For my own part, at least, I have reason to believe that my company is not less acceptable to you, my youthful friends, than yours most assuredly is to me.

“But to resume the particular point under consideration—it appears that old age is so far from being necessarily a state of languor and inactivity, that it generally continues to exert itself in that sort of occupation which was the favourite object of its pursuit in more vigorous years. I will add that instances might be produced of men who in this period of life have successfully applied themselves, even to the acquisition

of some art, or science, to which they were before entirely strangers. Thus Solon, in one of his poems written when he was advanced in years, glories that 'he learnt something every day he lived.' And old as I myself am, it is but lately that I acquired a knowledge of the Greek language; to which I applied myself with the more zeal and diligence as I had long entertained an earnest desire of becoming acquainted with the writings and characters of those excellent men, to whose examples I have occasionally appealed in the course of our present conversation. Thus Socrates too in his old age learnt to play upon the lyre, an art which the ancients did not deem unworthy of their application. If I have not followed the philosopher's example in this instance (which indeed I very much regret), I have spared, however, no pains to make myself master of the Greek language and learning."

ORIGINAL RESEARCH, EXPERIMENTAL AND INDUCTIVE.

(Continued from p. 208.)

“Dire n'est rien ; faire est tout.”—RENAN.

PHYSICAL RESEARCH ON NERVOUS MATTER.

PART III.

BRAIN MATTER UNDER ELECTRIC EXCITATION.

IN the present chapter I shall dwell more particularly on some recent electrical researches bearing on electrical excitations and conductions of nervous matter. They are intended to open up some new insights on an extremely interesting subject.

OBS. XXX. *Brain Matter under Electrical Excitement.*—The brain of a sheep was gradually dried down at a temperature of 100° Fahr. until it ceased to lose weight. It formed a firm, light structure perfectly opaque, and portions of it submitted to the flame of a lamp burned brilliantly, like wax. Other portions were submitted to brisk friction on a woollen surface to see if they would become electrical, as when glass is rendered electrical under such excitement; but no electrical excitation could be obtained, like that obtained from glass or other electrical bodies subjected to friction.

OBS. XXXI. *Test of Spinal Cord in Similar Manner.*—A length of fresh spinal cord derived from

the sheep was dried to complete desiccation, and was tested in a similar manner as the brain. Parts of it burned freely, but brisk friction of other parts gave no sign of electrical excitation.

Sir Isaac Newton had made for him a shallow box with a glass lid on the top. Into the box he was wont to put small, light figures shaped like forms of men,—such as toy soldiers,—and then, rubbing the glass briskly on the upper surface, was struck at seeing how the figures moved when the friction was made. It was an extremely pretty experiment, showing how some substances are movable by simple electrical excitation. The loose bodies disport about as if they were endowed with life. Paper objects take the most fantastic movements. They stand upright; they make movements on the floor of the box, like bodies in progression; they fly upwards towards the glass above them; sometimes they adhere to the under surface of the glass; sometimes they adhere to each other in curious shapes, one supported by another. In order to get a good result it is necessary that the box itself, the movable objects in it, and the glass plate should all be very dry and warm. When every condition is well-prepared, and the glass is duly excited by a woollen cloth, the slightest friction, with the fingers on the glass, will keep up the effect; and, by varying the shape and structure of the objects, most curious phenomena result. These facts led me to observe how nervous matter, dried down into flakes or reduced to fine powder by trituration, would, under the same circumstances—*i.e.* exposed to electrical excitation under glass—be moved and supplied with a motion akin to that of life.

OBS. XXXII. *Action on Dried Brain Pulp.*—One hundred grains of brain pulp, while quite fresh, were dried at 120° Fahr. to desiccation, standing over sulphuric acid, in the warm-air chamber. The mass was next reduced to fine powder, and parts of it were placed in a box with a glass cover, precisely like that into which Sir Isaac Newton placed the small paper figures. When the box was quite dry, the lid of it was briskly excited with flannel lightly coated with amalgam. As the friction began to tell, the brain particles commenced to move, until the touch of the finger on the glass was sufficient to produce movement. The little particles were so brisk in their motions that they looked like minute insects flying about, and some of them adhering to the under surface of the glass formed a layer upon that surface which was rather firmly attached to it.

OBS. XXXIII. *Action on Dried Muscular Substance.*—For comparison I treated another substance similarly. One hundred grains of muscular substance, dried to complete desiccation, were submitted to the same process as the nerve matter. Friction of the glass caused excitation in the same manner, and the particles of muscular substance moved about as those of brain matter had moved.

OBS. XXXIV. *Action on Mixture of Nervous and Muscular Substance.*—A mixture was made in equal quantities of nervous and muscular substance. Some nervous pulp was slowly dried down until it ceased entirely to lose further weight. It was then rubbed into an impalpable powder. A portion of fine muscular substance from the neck muscles of a sheep was dried at the same temperature as named above until it too ceased to lose further weight. The desiccated muscular

substance was then also ground into the finest possible powder.

Twenty grains of each of the above-named substances were intimately admixed, and the compound resulting was placed in the electric box already described, after it had been fully prepared. Friction was set up on the surface of the glass with the rubber, on which all the particles were brought into active motion. The effect was very curious : the nervous particles were of a whitish grey, the muscular of dark reddish colour. After a time, under the excitation, the whitish nervous particles rose to the under surface of the glass and adhered to it so firmly that the glass could be removed, and the crust of dust that remained had to be scraped off. The glass was replaced, the friction recommenced, again a layer of the compound powdered substance was acted on, and a second coat of nervous particles was imposed on the under surface of the glass. By repeating the process over and over again it seemed at last that, with the exception of two grains, the whole of the nerve material was winnowed out, leaving the muscular below ; but afterwards some of the muscular particles, under sharp friction, rose and adhered to the glass for a brief period.

We might infer from these observations that brain matter and muscular matter, divested of water but intimately admixed in fine division, were in such states of electricity that, being excited at a distance, they separated from each other. There are, however, one or two facts to be further investigated before this hypothesis can be acceptable. In the first place it must be admitted that I could not bring the muscular particles to the same fineness of division as the nervous, so that weight of particle may have caused a difference

of action, and the effect observed may have been no more than what would have happened from the mechanical action of a sieve. In the second place I found that the muscular particles appeared to absorb water from the air more easily than did the nervous, so that the question of weight again came into play. On the whole, however, I incline to the truth of an hypothesis of electrical division of the particles, a view strengthened by the circumstance that when nervous and muscular particles of a larger size rendered the effect on each other visible under a good lens, the different particular substances attracted and then repelled each other.

RESISTANCES AND CONDUCTIONS BY NERVOUS MATTER.

OBS. XXXV. *Resistance of the Brain Surface.*—I fitted up a small electrical cabinet that would enable me to estimate with accuracy the resistance, or the conduction, of fresh nerve matter. A continuous current was measured by a galvanometer—supplied to me by Messrs. Faraday—of the same kind as is used in the clinical electric cabinet described on a preceding page of this number (p. 262). A standard current was arranged so that the eighth of an inch of distilled water would cause deflection of the needle ten milliamperes. One hemisphere of a brain, removed from the head of a sheep that had just been killed, was placed on a glass plate, and a small platinum blade and conductor, connected with the anode, was passed vertically through the cerebral substance, so that the point of it touched the glass plate on which the brain rested. Then another platinum blade, attached to the opposite pole, was made to touch the brain surface at different distances whilst the current was passing from

the battery. When the poles touched each other there was a deflection of the needle forty degrees, and through water an eighth of an inch in thickness, ten degrees. On the brain surface there was no deflection that was appreciable at any distance. It was not until the two poles actually came into contact that there was any movement.

OBS. XXXVI. *Resistance of Internal Matter of Brain.*—The platinum blades, well cleaned and purified by red heat, were made to transfix the brain substance in all directions vertically and horizontally. The results were found to be the same as when applied through the brain surface.

OBS. XXXVII. *Resistance of the Spinal Cord.*—Portions of the fresh spinal cord were treated in order to test conduction or resistance, the same instruments of research being employed. The cord, cut transversely in discs, was tested in different segments, and was found to offer the like measure of resistance. It was the same as the brain substance itself in this respect.

OBS. XXXVIII. *Resistance of the Membranes Covering the Brain or Spinal Cord.*—The membranes covering the brain and those of the spinal cord were tested in a similar manner and with precisely the same results. The brain membranes and the spinal membranes were found to be non-conductors. Glass itself was not more decidedly a non-conducting surface at the pressure of current employed. The membranes seemed to resemble in this respect gutta-percha or a celluloid sheet.

OBS. XXXIX. *Membrane of Dried Brain and Cord.*—From the circumstance that the membraneous matter was so good an insulator, I thought it possible that when it was completely desiccated it might, like

cellulite, or glass, become an electric. To inquire into the matter I dried portions of membrane in a gentle heat, 120° Fahr., by placing them in the drying chamber. Discs and tubular sections were dried until they ceased to lose weight. They were then subjected to brisk friction, but they showed no electric properties, except that they were completely resistant to any current.

OBS. XL. *Some Comparisons with Blood.*—I thought it would be desirable to compare the observations relating to resistance or conduction with others derived from freshly drawn blood. Some freshly drawn sheep's blood, after being thoroughly defibrinated, was placed in an earthenware cup. The anode platinum blade was fixed in the middle of the fluid, running quite through it vertically to the bottom of the cup, while the platinum from the opposite pole was buried in the fluid at the distance of half an inch. The galvanometric needle was deflected ten degrees, and remained steadily there, as in the case of water tested in the same way.

OBS. XLI. *Conduction of Brain Pulp.*—The brain of a sheep, perfectly fresh, derived from an animal recently killed, was divested of all membranous and vascular matter. It was rubbed up into the finest pulp, and flowed easily from one vessel into another. Two hundred grains of this pulp were poured into a small porcelain basin which they just filled. The same chloride of silver battery of the same strength, the same platinum blades and conductors, and the same galvanometer were used. The platinum blade, attached to the anode, was plunged into the brain pulp near to the side of the containing porcelain cup, and the opposite platinum was plunged into the pulp at the opposite side, equally near to the cup. To my surprise the needle at once underwent, at the distance

of two inches apart of the platinum blades, a deflection of no less than twenty degrees ; and when the distance was reduced to an inch, the needle deflected thirty degrees and was well maintained in its place.

OBS. XLII. *Conduction of Brain Pulp.*—The same experiment was tested with the brain from another sheep, with all but the same results. The extent of the deflection varied a little in respect to distance. At an inch and a half distance the needle was moved only ten degrees on the scale, but deflection to five degrees was fully developed at two inches.

OBS. XLIII. *Conduction of Brain Pulp diluted with Water.*—Brain pulp, which seemed to conduct very freely, viz. to thirty degrees at a distance of an inch, was mixed intimately with equal parts of distilled water. The diluted solution was tested from the same current with the platinum blades, when the needle deflected precisely as if no water had been added. At the same time a new and very curious phenomenon was presented. On the platinum blade attached to the anode a large semi-solid coagulum or concretion formed. In the previous experiments there had been a slight deposit of condensed brain stuff on both blades, but here, on one, it was distinctive and abundant.

From this it would seem that the removal of membranous matter from brain substance and removal of vessels, with trituration of the brain matter into the fluid condition, have the effect of yielding a fluid that conducts better than either water or blood. Whether this is due to absence of membrane, to the combination of grey and white matter, to the effect of trituration, which exerts certainly a remarkable fluidifying effect on brain substance, are all subjects calling for further inquiry. Also, it is possible the results may be due to

error of observation, and will have to be corrected by patient repetition and variations of methods of research, which I shall be forced to follow and record in future pages.

Meantime I would suggest as a question derived from the first series of experiments named in this paper :— Whether the tissues of the body are not all charged with what has been called neutral electricity, and whether such electricity may not, under certain conditions, be always present, the two kinds being neutral when in combination, active when separated, re-passive when re-joined, and that in rhythmical order, upon which vital action and repose may depend.

Secondly, I would allude to the strange part which water seems to play in any electrical manifestation observable in the movements of the tissues. It looks as if water itself is either decomposable and recomposable in the presence of the various tissues; that the tissues absolutely deprived of water are capable of becoming movable by simple electrification, but without order, that is to say, in chaotic disorganisation; that water, being present, prevents direct electric action upon tissues as particles, until it is itself in decomposition or recombination, and then brings them together in different forms, as clouds are formed in the atmosphere, but in a more certain, definite, and steady repetition; or, that the solid material of living bodies floats in water raised to a given diffusibility, and takes shape and quality by the variability of the volume of water in activity or repose?

Lastly, at this moment, and subject to correction under further experiment, knowledge, and judgment, I would suggest that in the tubular arrangement of the nervous organisation the indication offers itself of the

outer covering of the nervous fibre being determinately resistant to current force, while there are refined states of an internal fluid susceptible of modification through friction, by which that fluid is rendered extremely susceptible to electrical current, and becomes, thereupon, in a condition of the greatest sensibility, lying enclosed in the tissues like a second circulation, to which the brain and nervous centres are as hearts and the nerves as affluent and effluent vessels.

“ON ELECTRIC REPRODUCTION OF FORMS.”

WHILST watching the action of electric excitation on portions of nervous and muscular particles in very fine division, an observation turned up that was new in its character, and seemed not merely curious but important. I have put it under a distinct head and title, with the hope of deriving fresh light from it in the future.

During the simple experiments of placing perfectly dried nervous and muscular particles in the Newtonian box, as I may call it, I thought it would be well to compare the two material substances of fine nerve and muscle with other animal or vegetable substances, equally well desiccated, and placed under the same condition for electrical excitation. I placed carbon, sulphur, magnetic iron powder, flour, and starch under excitation, with results that were instructive as well as novel. But what interested me most was the complete reproduction of form by the process adopted when animal substances were employed—bone dust *par excellence*.

Effect on Dried Bone Dust.

A few grains of dried bone dust were placed on the floor of the box, and the covering glass, having been placed in position over the dust, was subjected on its upper surface to friction. I expected, as actually occurred, that the fine dry particles would begin to move from the friction made on the glass; but I could not expect what really happened, namely, that portions of the dust, rising invisibly, adhered firmly to the under surface of the glass plate in the exact form of the structure that rested on the floor of the box.

The fact observed of the original form from the floor of the box was varied in the most different ways. The substance was laid out in the form of a cross. A portion of it rose, under the excitation, half an inch, and adhered to the under surface of the glass plate, taking the precise form of the cross below, even to irregularities of structure, so that the glass plate could be taken out impressed with the figure in an accurate degree in loose bone dust.

The figure on the floor of the box was changed. It was laid out in the shape of an animal, in the shape of a crown, in the form of letters of many varieties. It always rose to the under surface of the glass plate in the shape in which it had originally been formed.

A more curious experiment was the following:—Figures were cut out from a portion of paper, so that the paper looked like a playing card of diamonds, except that, instead of the diamonds being painted in the ordinary manner, they were made as diamond-shaped openings. The cut paper was laid on the floor of the box, and the openings were evenly filled with bone dust. The paper was then placed upon the

floor of the box, and stencilled with the dry powder. The glass was made to cover the whole, and was warmly excited, on which all the part of the bone powder rose, and adhered to the under surface of the glass, so that when the glass was lifted up, the appearance of diamond shapes of dust remained on the glass. Twelve hours later the figures were still distinctly and rather firmly adherent.

Effect on Silica.

In another set of experiments the dried bone dust was replaced by silica, reduced to very fine powder and thoroughly dried. The figures drawn on the under surface of the glass plate were, if anything, more definitely copied out than with the bone dust—that is to say, the angles at the corners of squares were more refined, and the lines were sharper in curves, as is seen in the figures of leaves and the outlines of plants.

Effect with Albumen and Bone Dust.

Upon a part of the under surface of the glass plate a disc of albumen derived from white of egg was lightly painted. On the floor of the box a thin layer of finely powdered bone dust was laid in a half-moon shape. The upper surface of the glass was exposed to sharp friction, and there soon rose to the under surface of the glass an excellent model of the bone powder, with finely distributed thin concentric layers of the bone substance round the central figure. The central figure itself was a perfect representation of the layer beneath, and for half an inch around it there was a clear round space which formed a very distinct ring, in which there was some

fine deposit. There was formed around it a large halo of a fine shade, cloudlike, which took a concentric form a good inch in diameter on the glass.

Effect on Albuminoid Membrane.

A fresh egg was broken and a portion of the lining membrane of the shell the size of a half-crown was spread out on the under surface of the glass plate. The membrane was then coated with a thin layer of the albuminous white of the egg. The plate so charged was placed in its usual position in the box, and beneath the albuminoid membrane there was laid on the floor of the box a thin layer, of the same circumference, of fine bone dust. Under excitation of the upper surface of the glass a portion of the dust rose and adhered to the membrane, and around the membrane there spread out on the glass a fine cloudlike halo of the dust, through which ran series of delicate lines in a horizontal or faintly curved direction. After the bone-dust cloud was complete the glass plate was removed and placed in the warm oven at 105° Fahr., where it remained twenty-four hours. On being removed, the portion of membrane covered with the dust was quite dry and looked and felt exactly like eggshell, lifting easily from the plate.

Effect of Bone Dust on Wide-spread Albuminoid.

A glass plate fitting the box was covered with a thin layer of albumen. A portion of bone dust was laid in the centre of the floor of the box. The upper surface of the glass was subjected to friction, on which a well-marked impression of the surface of bone dust beneath was portrayed in a strong layer, while, as in previous cases, a halo of the dust was distributed over the glass

in a large oval form. The glass, on being removed, was placed in the warm oven at 105° Fahr., and remained also twenty-four hours. Upon removal, a fine layer adherent to the albumen was spread out and fixed. There was in this layer diffused around the central prominence this peculiarity; there was a ring of a most perfect kind immediately surrounding the central layer and extending nearly half an inch around it. This ring was all but transparent, but was of the most definite character. It extended about half an inch from the central object, and from it was diffused a delicate cloud, thicker than itself and much larger, oval in shape and covering a surface quite three inches from the centre, the lines radiating from the near or lighter ring. It was a very pretty object, interspersed, at points, with slight depressions, like faint marks made with the end of a probe.

Effect on Phosphate of Lime.

The under surface of a glass plate fitting the box was coated with a thin layer of fluid gelatine, perfectly transparent. On the floor of the box in the centre was laid a thin layer of phosphate of lime the size of a crown piece, but made irregular at the edges, intentionally, with one or two deep clefts. The glass was placed in its usual position with the gelatinous surface beneath; the upper surface of the glass was then subjected, in the usual way, to brisk friction, on which the phosphate of lime rose in the centre in considerable part and formed on the glass a precise image of itself, so that on comparison one image could easily be mistaken for the other. The glass was taken out very gently, when the following appeared. In the centre was the facsimile of the lime layer one inch and a quarter long,

and at one part an inch wide, but with all the irregularities that had been marked on the original lime deposited. Around this centre, the margins of which were a little intensified, there was another finely marked layer, the fourth of an inch broad, completely surrounding the central mass, but not following it in outline; being, in fact, very sharp at its edge though a great deal lighter in tone, and laid down in very distinct and fine encircling layers. From the external outline there ran other figures of the lime, extending lengthwise in one case one and a half inch, in the opposite direction one inch, in a lateral direction about one-quarter inch. The long parts gave a kind of external bat's-wing form to the centre, the layers seemingly concentric. The mass in the centre was very firm and bonelike in construction, but did not seem concentric like the final parts, the electric fluid not appearing to disseminate it equally, and leaving in it two or three oval-shaped thinnesses, which admitted light much more freely than its surrounding parts, except at the circumference.

Influence of Water.

The same kind of influence of water was observed in these experiments as in previous ones. If the under surface of the glass plate were moist there were, invariably, figures and outlines of the substance, with diffusion over a wide surface with occasional condensations and points. It was also observed more than once that, when a figure formed from dried material had been rubbed off the glass, so that the glass presented no surface of any figure upon it and was everywhere equally transparent as it seemed, the curious change took place which has been before observed, and ably

demonstrated by Mr. Crofts ; that is to say, when the glass was exposed to water vapour in the form of a light steam jet, the figure that had been previously marked upon the glass re-appeared when the surface was made moist by the water vapour, but passed away as the water evaporated.

The above is presented as nothing more than a mere piece of original nature writing, which must not be left to rest at this stage of inquiry.



COTEMPORARY PRACTICE AND LITERATURE.

"Every physician will and ought to make observations from his own experience ; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."—FREIND.

HISTORY OF MEDICINE.

N a volume of four hundred and twenty-four pages Dr. Edward Theodore Withington, an Oxford scholar, has brought out a volume of Medical History from the earliest times, a popular history of the healing art, with two illustrations.*

Nothing could have been more fortunate than Dr. Withington's effort, nor could he have rendered it in better language than in the quotation he makes from the late Dr. Oliver Wendell Holmes. "The *débris* of broken systems and exploded dogmas form a great mound, a Monte Testaccio of the shards and remnants of old vessels which once held human beliefs. If you take the trouble to climb to the top of it you will widen your horizon, and in these days of specialised knowledge your horizon is not likely to be any too wide." Alas ! our dead scholar Holmes has spoken only too truly in these words, and good it is that the author of the book before us has been touched by them. If there ever was

* Published by the Scientific Press, Limited, 428, Strand, W.C.
Price 12s. 6d.

a moment when such a book was called for to arrest the attention of medical men of all the world it is this moment, when medicine as a past history has become mere dead leaves, blown aside by every wind that passes, and looked upon as something beneath the contempt of the wiseacres who scamper over them. Sometimes in casual conversation we catch a stray observation that there ought to be a chair of Medical History in our schools and colleges, from the teacher of which the student could learn that he is not of to-day, but ought to be of all time. Then will follow the contentious laugh and the silly observation "that there's enough to do without that," as if the trifling that is now going on, and the pettifogging inquiries which haunt the so-called highest places, were worth anything compared with what must necessarily exist in the book of the feats of medicine from its earliest to its latest representation on the earth.

Dr. Withington most clearly understands the richness of the mine he has opened, and although, from limitation of his work, the knowledge it shows cannot have its just appreciation, still it stands miles above the vast surface of specialistic *débris* which forms the literary pavement of our age, for he has striven with true scholarly ambition to put forth, in the most forcible style and method, a slight outline of the rich treasure that lay before him. He might have been content to have taken only one section or column of his temple from its great abode, and to have described that one part, what it meant, what it influenced, what time it flourished; often he could have expanded into a volume a single page of his work; but he has done best by setting forward in miniature, as it were, all that he has surveyed. The human mind is miniature, and is

often more content when it is arrested with a map of miniatures, than with a single great picture of one grand impression. Often it is led, as if naturally, from a single minute lesson it has learned amongst many, to court the possession of some small subject displayed afterwards in its glory; and no one can read this book slowly and carefully, as the writer of the notice of it has done, without feeling how thoughtfully the author of the book has explored, defined, and put into tempting form the numerous phases of medicine to which an industrious mind has been attracted.

The plan followed in the book is not that of a history in which men and things are made to follow by sequence, and yet it cannot but be called sequential. It is indeed a series of short chapters, each chapter a picture representing medical series in order, so that even the table of contents cannot be read without conveying to the intelligence the methods of men by whom our science has been developed through the ages. Thus each chapter itself affords a reading which delights and improves, and not infrequently startles, the understanding.

In illustration, turn to chapter xlv., p. 254, on Paracelsus, and, on the same topic, chapter xlvi. I have read the two chapters, and Paracelsus stands before me. I can talk to him and feel the reasons why he influenced his generation, and long before he had arrived at his full days, not to mention honours, destroyed himself by his enthusiastic observations and declarations. He is made to condense his theory, "There is nothing in heaven and earth that is not in man; and God who is in heaven is also in man." That is to say, in the words of a predecessor even of Paracelsus, "There is a natural body, and there is a

spiritual body. . . . Howbeit that was not first which is spiritual, but that which is natural; and afterward that which is spiritual." Again: "Diseases are caused and cured by the actions of the various constituents of the universe—the macrocosm—on their corresponding parts in man—the microcosm—from which it follows that the physician must take all knowledge as his province, and that medicine is the highest and widest of sciences, since it includes them all, from theology downwards."

It would be a real pleasure to go on quoting, from Dr. Withington, other typical narratives and the uses he makes of them, but it is far better for the reader to court the pages himself, and to discover that he has become himself a greater man through a most obliging master; that he has become acquainted with men whose names he may not even have heard; that the very roots of the forgotten tree of medicine are opened to view; and that hosts of whimsical fancies now abundant are but the shadows of things that have been.

If there is a criticism evoked by this book, it is small, but perhaps deserves notice for the very amendment of the book in a future edition. It is that the author, himself conversant with the details he has to communicate, occasionally introduces a figure without at the moment relating the name with sufficient directness; so that the reader, all absorbed, has either to gain the name by inference, or to go backwards or forwards in order to obtain it. Setting aside these small blemishes in an arduous task, Dr. Withington must be congratulated on the industry, learning, and wisdom he has thrown into his work.

GERM THEORY DISPORTS.

R. LAWSON TAIT, whose intrepidity and courage even his enemies admire, has brought down upon himself certain merciless attacks for having ventured to criticise, with his usual terse and strong opposition, the germ theory of disease. He has gone against it root and branch. He has denounced the theory as destitute of the essence of inductive Baconian reasoning, and how hard he has hit the nail on the head is best illustrated by the trenchant yet often wild replies with which he is answered. One of the most serious shafts levelled at him is from the pen of Dr. William R. Pryor, in the *New York Medical Journal* for December 22nd, 1894. At the close of his article Dr. Pryor says, in answer to Mr. Tait: "The germ theory of disease has not proved an inconstancy and a broken reed, a thing which yields at every blast, either of scholastic logic or eclectic experiment, but is a theory logically proved, which gains strength with every fresh experiment, and the very failures of which but prove some law already accepted. As the opponents of the germ theory could not have found a bolder, abler, more aggressive champion than Mr. Lawson Tait, truly has the last great gun against our advance been fired and burst in the discharge."

These are strong words, but Dr. Pryor has not answered Mr. Tait in any particular. He has merely endeavoured skilfully to support coincidence as a cause, and in his argument has not left it clear, as he was bound to do, that any particular cause for particular phenomenon has been, by exclusion, proved to be the only cause. It is with Dr. Pryor a matter of "ifs." If the diphtheria

germ is found in diphtheria; *if* with it we include an animal; *if* with animal blood serum we expel from a child's system the diphtheria germ which infects it, surely the case is proved by a test far more crucial than the Baconian method of reasoning. Truly "there is much virtue in an "if," and if "*ifs*" were facts a powerful enemy would indeed be slain.

CONCULCATION VERSUS INOCULATION.

DR. NEWSHOLME, editor of *Public Health*, in a very courteous notice of my address to the Sanitary Inspectors' Association, is in doubt of the new word "conculcation" taking root. "Stamping out," which means the same thing, is, he thinks, equally convenient, and much plainer for simple people. On one condition I quite agree with Dr. Newsholme. I much dislike the introduction of new terms in medicine, unless they are very explicit indeed. If therefore he will be willing to give up the term "inoculation," which signifies "stamping in," a term equally convenient and much plainer for simple people, I will withdraw the word "conculcation" at once. Nothing could be better or convey a stronger lesson to the people than the term "stamping in." To stamp in a disease is as plain as A B C, and gives an exact explanation of the act that is being done, without any touch of Latin mystification. But so long as a Latin term is used for stamping in, so long it is fair to use a Latin term for stamping out, Latin obscurity, such as it ^{is}, being just as learnedly good for the one act as for the other.

Dr. Newsholme agrees with me in preferring conculcation to inoculation. Conculcation, however, assumes, he thinks, that we have a complete knowledge of the disease which it is proposed to stamp out, and such a knowledge he conceives to be obviously impossible, and supposes I would surely not affirm that perfect cleanliness of body and mind will, by itself, eradicate such a disease as smallpox. I find from this passage that I was guilty of an omission in my previous paper. I ought to have said "perfect cleanliness of body, mind, and *place*," with which addition I do assume that even smallpox could be eradicated; would, in fact, go out of itself, and become a curiosity in disease. "Assuming," he adds, "for the sake of argument that the practice of inoculation is only a passing phase of hygiene, are we to refrain from this, to stand still and do nothing until our knowledge of the etiology of smallpox has become sufficiently complete to enable us to stifle it in its birth? Are we likely ever to reach that millennial period?" Dr. Newsholme is hasty in considering that the knowledge he suggests is millennial; a great deal more is required for a millennium than the mere information he demands. He is in error also about the words "stand still and do nothing." That, in the matter of inoculation, is what we are actually doing. We are spending all our time in pursuing inoculatory methods. We are like the boy running to find the bag of gold at the foot of the rainbow. In this course we labour hard, struggle through bogs and swamps, get very dirty and wearied, and then see our delusion vanish, we know not whither. Meanwhile the science that would lead us to the cause of, and extinction of, disease—the true and only hopeful science—is allowed to pass as if it were an illusion admitting only of scorn

towards those who follow it and expect the truth out of it.

There is nothing so lamentably opposed to progress as that universal error which becomes practical truth. It does more than evil. Accepting it granted that inoculation can do no wrong; that it is the first means to be followed; that, whatever comes, it must have its way without inquiry, it stands actually in the way of discovery, and often does not permit the most candid mind to venture so much as a doubt on what is supposed, but not proved, to be best. So we get set up before us, as absolute dogma, such a dogma as "immunity," or such another dogma as is "anti-toxic treatment." We listen, we are told to believe, we are bound to accept, and when failure arises during the acceptation, our belittled natures are asked not to question, but to rely on the evidence of men whose very style of writing and expression would, in common matters, be allowed to render their evidence, as well as their argument, of the most rudimentary order.

There can be no doubt that it is very difficult for men trained in current schools to be independent on questions of thought and practice. It is not wonderful that the vibration of thought passing from one individual to many should infect the many, for the many are not critically cultivated, and are influenced by the sound which is strongest and most plausible. It is in this way that great errors of the most widespread character have often found their way from one or two simple sources, and that universal error has become practical truth, with the fiercest denunciation of all who doubt the so-called "original" start. But it is not fair for any one to cultivate this condition of mental state, and it is certainly most unwise to assume that,

because multitudes believe, therefore multitudes must be right. For my own part I am content to watch for myself, and would rather be the student of nature than the slave of intolerant belief. This, with all kindness to Dr. Newsholme, whose powers deserve the warmest admiration.

MODEL DICTIONARIES.

GOULD'S DICTIONARY OF MEDICINE.

THIS dictionary, by Dr. George M. Gould, based upon recent scientific literature, and containing 1633 double-column pages,* is indeed a model. It is an illustrated dictionary of medicine, biology, and allied sciences, including the pronunciation, accentuation, derivation, and definition of the terms in daily use in our profession. The book is beautifully bound, and the pages are so cut that you can at once turn to any letter, and I do not think it possible for any terms to be more tersely or satisfactorily defined. In my library there is not a book that is more useful, whether I wish to turn to definition, pronunciation, origin of a word, or illustration. The labour of preparing such a work makes those who look on it feel idle, and recalls some of those great labours of literature which were written in the early days by such men as Helkiah Crooke, from whose pages practitioners not only learned but actually practised.

Of necessity the cost of such a book must exclude it from most private libraries, although it is worth any man's trouble and expense to obtain it, since there is

* London : Baillière, Tindall & Cox, 1894.

no subject that can occupy the medical mind to which it may not prove a work for immediate reference. Certainly every medical and public library should possess it.

WATT'S DICTIONARY OF CHEMISTRY.

THE fourth volume of this dictionary is now completed, revised, and entirely re-written by M. M. Pattison Muir, M.A., and A. H. Forster Morley, M.A., B.Sc.*

Those of us who remember Watt and his original Dictionary, the laborious nature of the work, and the interest it excited as coming from one man, will be pleased to see how that important treatise has now become developed. We have no such chemical dictionary in our language, and as far as modern book-lore in any language is concerned, there is not one more accurate. I have heard it urged that the book is too elaborate to be useful to the ordinary practitioner of medicine. I do not think that this ought to be a charge brought against it, but rather that the practitioner should be glad to find in his possession clear definitions, in the best form, of the most abstruse subjects. The four volumes are, in fact, a series of treatises from which every one should learn. For my part, I never understood the true meaning of the *viscosity of liquids*—never in such a manner, at least, as was agreeable to my mind—until I turned to p. 268 in Vol. IV.: there in some six columns I meet with the whole subject, admirably described in its elementary as well as in its more complex parts; I learn the names of the men who have studied it, and I learn the characters of the

* Longmans, Green & Co., London and New York, 1894. Price £3 3s.

substances, which represent the phenomena more clearly than in any other work. This is but one reference. I might turn to the question of chemical *types*, and again I should find in a few columns the essence of typical phenomena, with the knowledge of being in possession of the latest views that have been recorded on the question, the putting together of like things in chemistry, or putting apart things that are unlike. But should the practitioner of medicine feel the book too elaborate for his own private study, he ought certainly to see that in every public library, club library, school (university or general), within his sphere, Watt's "Dictionary of Chemistry," by Muir and Morley, is within reach.

It is unnecessary to add a word of commendation of the learned authors whose names I have given. Their industry and method are beyond all praise. But it ought to be recorded in favour of the publishers of the work, that the care with which they have seen it brought out, the enormous expense to which they must have been subjected, and their vast enterprise, demand the warmest recognition and obligation.

DISEASES AND DEFORMITIES OF THE FÆTUS.

Y shelves are this time packed with books of unusual value, numbers of which I should like to notice. Dr. Ballantyne's two volumes on *The Diseases and Deformities of the Fætus** are an irresistible temptation. I won my first medical honour—the Fothergillian gold medal—for an essay on

* Oliver & Boyd, Edinburgh, 1895.

this subject—not including malformations—as far back as 1854. The essay has never passed from my mind, and in its unpublished form is reawakened to me by the intelligent work my learned rival has now issued. In his first pages the importance of his subject is admirably brought out by Dr. Ballantyne in what he tells us about infant mortality. He relates with candid mind that, although all the deaths which occur in infants in the first years of life cannot be ascribed to foetal morbid states, few will hesitate to assent that a great number of them are due to conditions, the result of intra-uterine disease or mal-nutrition. In Britain the expectation of life for the young infant was no better at the end than at the beginning of the last decade. During the year 1891 the rate of mortality for infants under one year of age was, in London, 154 per thousand; the average rate, in the twenty-eight large towns, was 167 per thousand, varying from 227 in Preston to 137 per thousand in Brighton; whilst the annual *total* death-rate for 1891 was 20·2 per thousand, so that infants under a year suffer to an extent which people at large never conceive. I name these introductory remarks as leading to the desire for the still greater lessons that remain.

There is another chapter on the “General Characters of Foetal Disease,” which is singularly fruitful to the mind and original in thought. In this chapter, at page 100, the author deals with diseases and morbid conditions in the embryo, and contends that the diseases of the embryo will be found to differ much from those of both foetal and extra-uterine existence, the physiological conditions that exist before the formation of the placenta not being the same as those which are met with in the later months of the intra-

uterine life. There are no small number of scholars who will be inclined to say on this matter, "Pray let us hear more on a point so absorbing." I wish I could ; but I prefer to leave to my readers the task of studying the volumes on their own account. They will find themselves students of a work worthy a first place in every medical library the wide world over.

DEATHS IN THE PASTEUR INSTITUTE.

HE *Times* of June 4th reproduces from the *Annales de l'Institut Pasteur* (page 5) the fact that there have been six deaths from hydrophobia in the Institute since the month of August, but in five of the cases the animal which inflicted the wound was certified, by veterinary certificate, to be mad. In the sixth case, the dog which inflicted the bite was a stray one and could not be found. They seem all to have been French subjects, the youngest seven years of age, and the oldest sixty-two. They do not speak in favour of a supposed remedial method, which on the ground of its validity should not logically have allowed a single one of the deaths to have taken place. The facts are all for the one logical and certain plan of stamping out, the muzzling of the animal that could communicate the poison of the disease. Why there are seasons when such stamping out should be called for, and why there are seasons when neither it nor institutes should be wanted, we have yet to learn.

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3rd
Quarter,



1894-5.



*ANGINA PECTORIS, ITS NATURE, CAUSE,
AND TREATMENT.*

I HAVE encountered in the course of my practical life forty-three well-marked illustrations of the disease called angina pectoris. In the hurry of practice, as in the dispensary, I must have met with many more, but I refer exclusively to the numbers named, because to them I have paid special attention, and can, therefore, specially speak of them. It is also to them and the course of their symptoms to which I shall particularly turn in this brief discourse. I shall not look at any book nor quote any author, however much I may respect it or him, or hold either in memory; the cases, in fact, shall be the book from which I write, and on which I shall comment.

By whatever name we look at the symptoms, they constitute fairly a distinct disease, and perhaps, in our present state of doubt, the term commonly chosen, of angina pectoris, is, on the whole, the best. We all recognise the term fully, and we speak to each other candidly in respect to it. Several of the cases to which I am making reference have been sent to me by other practitioners and from various parts, but they have all come under the same name. Once or twice, it is true, some observation has qualified the word, but taking it,

generally, it has maintained its character. Hysteria has, in rare instances, been suggested as an explanation, and I have seen some reason to accept the possible correction, though it has ever been too near to the real disease to allow it to be strictly permitted.

As to the nature of the illustrations, they have been, of necessity, very closely allied, and I notice first that the male sex is by far the most commonly affected. It is only twice that one of the female sex has been the victim. Usually, too, the male subjects have been of middle age, or past the middle age. In the majority of instances they have been past it.

I have tried to ascertain carefully if there were any direct heredity, and I must say I have not detected the fact absolutely, although in one or two examples I suspected that there was some hereditary influence, but I was not certain. In a large majority there was, either by coincidence, or by relation of cause and effect, a legacy of either gout or rheumatism from the father's side. At the same time I have failed to trace in the sufferer the signs either of rheumatism or gout, from any of the common causes or conditions provocative of those affections.

By far the larger number of the sufferers have been middle-aged men who have led a busy, often comfortable, and vigorous outdoor life. They have been active men, and, as a rule, very laborious and troubled men. I dwell on the last-named fact earnestly, for it seems to me of intense moment. They have been men who have had, or have felt they have had, a great deal to account for. They have been over-ambitious, and have failed to get all they wished; they have been men who were self-conscious of having done some wrong act or deed of which they were ever afraid of being discovered;

or, they were of a most refined mental constitution, victims of a continuous fear lest in any way they might do something that should seem objectionable to the world at large. Finally, they have sometimes been persons who, against their wills, have been forced to do more than was in their power, and have been perpetually harassed with difficulties they did not feel able to overcome, or did not feel capable of resigning to fate ; as if, so long as they lived, they were destined to bear and suffer.

I do not wish to enter into any of the details to which I have referred, but name simply the general fact as a special guide to those who, in the course of their profession, may professionally meet with the malady. They, I think, are sure to find in all instances a temperament which will be of the strongly nervous character. It will rarely be lymphatic, rarely bilious, but always nervous, and occasionally somewhat sanguine as well as nervous. The sufferers are too nervous to commit suicide ; in fact they are really tenacious of life, and not infrequently fear the action of the medicines supplied to them. Still they are ready suddenly to die, and on the whole are patients who call for true and sincere pity, though it is rather dangerous to extend it to them, since they do not bear commiseration at all favourably.

It has been assumed by some, that in all anginal cases there is certain evidence of disease of the heart, and it is a common argument that there was, or must have been, disease of the coronary vessels, dilatation, or thickening of the coronary arteries, with defect in the coronary circulation. It is further assumed that if there be no disease in the coronary system there is disease of the heart itself ; a valvular interruption, or

irregular action of the ventricular walls. Respecting these changes I cannot deny that they may be present, for I have found them after death ; but, they certainly are not necessary, and may rather be considered as coincident than as any sort of direct cause. I name this view because I have met with the most perfect examples of angina pectoris, with every expected symptom well marked out, and after death, occurring even during the attack, have been unable to discover any kind of cardiac lesion. In fact, I am quite sure that the specific symptoms may be over and over again demonstrable, and there may be no evidence of cardiac organic failure. Again, I have seen illustrations in which the signs of cardiac interruption were manifest at intervals and yet the original and specific symptoms were absent when death took place.

It seems to me, therefore, that the pure angina pectoris is not essentially cardiac, and that the presence of cardiac disease with it is rather collateral than necessary. I do not say that true cardiac mischief may not render the condition of a patient more extreme or dangerous ; but I would not exaggerate the combined evils since there may be the extremest danger from the disease alone, quite apart from what would appear to be cardiac.

I have never seen any particular symptom that can be considered organically central in angina pectoris. During a paroxysm there is often a good deal of central disturbance, with a sense of giddiness, a sense of syncope, a feeling of dismay or fear, and a fixed desire to sit down, as if that prevented falling to the ground ; there may also be distinct rigidity of muscles. But after the attack has passed away the mind is perfectly clear, and the whole of the events are duly recorded on the mind,

without any further irregularity, residue of pain, discomfort, or spasm. The patient will tell you all that has occurred, will not do more than dread the recurrence, will show no indication of strain, paralysis, or feebleness, and will know of no nervous symptom other than fear or dread of the return of the seizure.

It is the same with the pulmonary organs, in so far as intermediate indications go, though it is different in respect to the paroxysm itself. In the paroxysm, it must be admitted that the condition is simply terrible. It is in the chest that suffering seems to be concentrated. The chest is, as it were, pierced or transfixed through and through. The breath is held, and, as more than one of the sufferers has expressed to me, it is as if the chest were in a vice, one blade of which was on the centre of the back, and the other in the sternum at its centre. The chest feels as if it were filled and dilated with air which it is impossible to expel. The chest, in fact, could not be emptied—neither could it be dilated or filled; and the coldness of the surface of the body, the whiteness and fixity of the features, the condensation of water on the brow with running of it down the cheeks, and the apparently rigid state of the limbs, all testify that there is no true breathing power. Yet it is not asphyxia that presents itself: it is rather syncopal unrest; and, indeed, there appears to be no exhaustion of air, and no change for the better until there is a certain degree of relaxation of the diaphragm and of the muscles of the intercostal spaces.

It is astonishing how quickly the relief comes and how speedily the attack is over. I knew a member of our own profession who frequently experienced a bad attack whilst attending a woman in her accouchement

and who afterwards proceeded with his business until the end without any error. Of course it was a dangerous attendance, and at my suggestion he gave it up; but it shows how speedily the attack passes off.

I do not know of any seizure in which the voluntary muscles were affected with violent convulsions. The voluntary muscles seem to be affected and rigid; but that is not from any kind of active movement. They are fixed, but are rather void of motion than troubled by it. This, however, does not appear to be the fact with regard to the involuntary muscles. I have no doubt whatever that the involuntary muscles are peculiarly influenced; they are seized with contraction, and there is sometimes, by contraction, the voidance of such laid-up fluids as the urine. It is also quite certain that the semi-involuntary heart is held for a time in abeyance, and the same may be said of the involuntary or semi-voluntary organs of the respiration, and occasionally of the intestinal canal, as shown by the escape of flatus.

Taking it all in all, the seizure is very extensive, very paroxysmal, and, if it were attended with vehement muscular movements of a voluntary kind and with unconsciousness, would rank as an epileptiform seizure, to which it is obviously allied.

Fatigue does not naturally lead to an attack; hunger, I think, sometimes does, and so also does a full meal. Great thoughtfulness and depression certainly favour a paroxysm, as does sudden excitement due to anything that arouses the feelings. I, one day, knowing nothing about the physical state he was in, called unexpectedly on a former friend who had retired to a country place. The call leading to the recollection of old times and old friends, produced a seizure of a light kind, which, being

repeated when, at his earnest wish, I called again, I had in future to keep quite away. Some few months afterwards I heard of my friend's sudden death after a comparatively slight agitation.

I have said, a little before, that men of very active, anxious, and laborious minds are the commonest victims of this disease. That is quite true; but it does not apply to all such men—it only applies to some. I know many men of the most active type, and of the anxious, sleepless type, who know nothing about anginal seizures, and, though they may suffer, suffer quite in a different way. It is clear, therefore, that men either present angina pectoris as if born to an inherited calamity, or bear it as if caused by mental action, which may be good or bad.

It may be asked what was the nature of the two cases referred to in young people, and which I have called cases of angina. Candidly, I do not fully understand them; but, as the immediate symptoms had no other characteristics, I am driven to give them the only assignable name. The patients were girls. One was recovering from an acute febrile attack, and, although food was not acceptable to her, she was convalescing and fairly well. At night, when she was in bed, she was suddenly seized with the pure symptoms of angina pectoris, during which she died, while I, who had just been summoned, was endeavouring to aid her. She was left quite rigid, as though she had been made so from loss of blood; and some hours after death we found, at the post-mortem, the heart contracted firmly to the smallest size. In the other case, also in a young woman, the symptoms suddenly developed, and were at first thought to be those of hysteria, lapsing quickly into death; she was dead and rigid on my arrival. In neither case was there any

detectable cause of sudden death, apart from the idea of angina, unless we chose to designate them as examples of extreme hysteria or of idiopathic tetanus.

TERMINATIONS.

As regards the termination of the cases of angina pectoris that have come under my notice, I may say that only in the two named above have I been present at the moment of death. Some still live; some appear to have recovered; others are dead. All who have died have fallen suddenly from the malady, and without any more cause, apparently, than that which may have led to a previous attack; that is to say, the cause could not be certified to be more severe than previous ones, though it may have been. In three of the fatal cases I have been at the post-mortem, and in the others have heard the details of the final seizure.

In every fatal case, during the seizure, the symptoms have been much the same. They have been the same as those already described, but have passed into death from the prolonged continuance of them, or from having occurred when the body was in a bad condition to bear them, either from its own indifferent state, or from the environments to which it was exposed, as I shall indicate at a later period. In all there was a final act of rigidity of the voluntary muscles, a rigidity amounting to a tetanic form, the flexor muscles being in the worst state, so that the nails of the fingers were clenched into the palms of the hands and the lower limbs were curved from the flexion. In the post-mortems I made, the bodies, within twenty-four hours after the death, were still distinctly rigid. The lungs were not congested, nor otherwise changed; but the heart was firmly con-

tracted, and the ventricles empty of blood. The large intestines, in all cases, were charged with gas; but whether this was or was not an after-death effect could not be declared. The brain in every instance was examined, and was in two cases found free of any congestion or any disease; but in the third case there was thickening of the dura mater on its superior surface, some sign of serous effusion beneath, a clot in the straight sinus, and some effusion at the base, the structure of the organ cutting healthily, and the ventricles showing no distension or enlargement. In the last case the urinary bladder was filled but not distended with the secretion; this patient had been free at times with the use of alcohol; but there was no evidence of death from excess, and the liver and kidneys showed no sign of marked degeneration; he was a man of middle age, had moved considerably about the world, and was always of restless disposition. Several of the patients who have been under observation have attained to a certain degree of cure. The surgeon to whom I drew attention above became almost entirely free of this disease when he left off practice, was able for several years to go abroad, and, returning home, lived in a delicate way for a long time, and at length died from cerebral failure without manifesting the least trace of angina or any affection of the heart or chest. Some suffer at intervals, and then for a period are comparatively free. They are always worst when troubled with over-anxiety, depression, or sleeplessness. Not one to my knowledge has committed suicide.

CAUSE.

In true angina pectoris there is no known and fixed organic manifestation of disease. This is a point

always to be kept in mind. There are, in varied cases, collateral or coincident forms of disease, but these might be present, although there were no sign of angina. In itself, angina stands alone, and, as already said, that fact marks it as a distinct disease. It seems to me essential that this truth be recognised, and it is probably due to absence of any clear definition in the matter that the disease has been assigned to such a number of different causes. In plain language, every case has been credited to some particular lesion, if any lesion be present, as though the lesion itself constituted the cause of the affection, whereas it had nothing to do with it save as an occasional accompaniment, which, though present, would stand of itself, and be of itself a disease.

A medical friend sent a patient to me, saying: "The case is the same as the last one we saw together; he has every sign, as the last one, of mitral stenosis; but there is this difference that, in the present instance, the stenosis is the cause of a constantly recurring angina pectoris which is painfully dangerous, and will, I fear, be the cause of a sudden death, although *why* in this instance the stenosis causes the special symptoms, and did not in the other, I cannot tell. I can only suppose that here the coronary circulation is implicated with the mitral obstruction, as a result, probably, of an attack of acute rheumatic fever which occurred several years ago, and was followed by the valvular condition, or became an accompaniment of it. It is certain, at any rate, that the cardiac murmur was present long before the angina, and that while there was no other sign than it, with a rather irritable heart during fifteen years at least of active life, it yielded no indication of angina. The angina has appeared under severe anxiety and disturbed sleep."

The statement thus recorded would be, I think, a pretty common comment on the symptoms, and would, as usual, be put as the fair expression of the professional mind. In my view, however, the two diseased conditions had no single cause; the angina was in no way a part of the old and long standing cardiac evil. It would have come on whether there had been heart disease or no heart disease. Certainly the heart affection added to the anxiety about the case and to the danger, but it was not, I suspect, a relation of mitral disease as a cause of angina.

On examining this patient carefully the history showed the truth of his condition. The patient was a well-made man, who moved about with facility, and at times, was extremely cheerful. At other times he was depressed and fearful, and he suffered more in warm than in cold weather. At some periods he passed a great deal of pale urine, but it contained neither albumen nor sugar, and it was free of any deposit or unusual colour. He remembered well the attack of rheumatic fever, and was quite conversant with the heart mischief that followed it, a sequence that had been detected and objected to by more than one insurance company. But these symptoms of angina came on, as he believed, quite independently, and as the consequence purely of telling anxiety to which he had been exposed with others who had suffered quite as much, or more than he, from anxiety, but in no way from the particular state that had so specially seized upon him. His attacks were strikingly paroxysmal, partaking of the nature of "fits," as he designated them, and which recurred without much notice as frequently as three or four times in the week; on one occasion, twice in twenty-four hours, and, on another, once in three weeks.

The attacks were always dangerous, but differed in intensity, and were at no time felt to be connected with the old symptoms in the heart.

This case is named somewhat in detail because it so fairly represents a true case of angina pectoris in which all the symptoms are included. It is good also because it bears out what I am about to advance in regard to the true cause.

I would, then, suggest that angina pectoris is, in itself, an actual disease, a disease of a paroxysmal nature, and quite as distinct as epilepsy, partaking in many ways of its features, and being of a similar and of as universal a character. The difference is that epilepsy is an affection of the cerebro-spinal system, and is, therefore, attended by vehement contractions of the voluntary muscles, by which the accumulated muscular energy is thrown off, and, possibly, the cerebral and spinal; by which acts life is for the time saved, although for a period brain power is suspended. Angina pectoris, on the other hand, instead of being dependent on a disturbance in the cerebro-spinal system, affecting all parts under it, is due to a disturbance in the sympathetic nervous system, and affects all parts under that system. What the precise change in the sympathetic nerves may be, I am not more able to define than I should be able to define that which occurs in the cerebro-spinal system in epilepsy. In both cases it is probably a change in the body of a ganglion or centre, extending throughout the whole supply, and causing effects in all the parts involved. In angina it is a violent sympathetic discharge with an unconscious spasm, a primary spasm of the unconscious or involuntary muscles. Everything in the attack points to this condition; the intensity, the comparative suddenness

of the seizure; the connection of the seizure with intestinal disturbance; the increase of the seizure with those events which spring from tribulation of the sympathetic nervous chain; the phenomena presented on the surfaces that lie in the terminal nervous currents of the terminal vessels; the whiteness of the face; the fixed chest; the powerfully contracting heart; and, the rigidity of the voluntary muscles when the heart and blood-vessels are unable to pour into them the necessary quantity of blood. In brief, the phenomena, one and all, show the universal change originating in the sympathetic centres.

It has only lately occurred to me in full that the origin of the disease is as here stated. By the process of excluding all causes but the one particular cause capable of producing the phenomena, I have been able to make a distinct explanation. It is true that ever since I witnessed the first example of angina, now over forty years ago, the affection appeared to me to be as distinct as epilepsy, but why it should be one not dependent on any visible lesion is of much later date of conception. If I could send a powerful electric vibration through the sympathetic system, apart from the cerebro-spinal, the phenomena would be those of angina pectoris, not of epilepsy, and this is precisely what occurs. I have seen the same thing in animals that have been stricken down by electricity. They die after the electric shock, not by epilepsy, nor by asphyxia, nor, at the moment, by syncope, but by a kind of angina. The sympathetic system carries the current; the line of nerves is marked throughout by the current, and is rendered of deep darkness; the chest is fixed; and when death comes on there is extreme rigidity, or rigor of the voluntary muscles, so that the body is as

firm as a piece of statuary ; in fact, it is tetanic throughout. The cause of the tetanus is not, however, due to the direct action of the current on the voluntary muscles. It is due to the extreme contraction of the heart and of the endings of the minute blood vessels, so that blood is withdrawn from the heart and from the muscles, on which the whole become rigid and tetanic.

I dare not, at this moment, speculate on the nature of the change in the sympathetic cords or ganglia, which gives rise to the anginal shock—a shock extending through the whole of the organic system. The irritation may spring from one large centre, like the semilunar ganglion, and may spread from it to the other parts. In some respects, this seems to be the case ; because it is the rule that dyspeptic symptoms precede the seizure, symptoms, for example, of flatulency, weight, or stomachic uneasiness, by which the irritation is conveyed quickly to the central ganglion itself, a ganglion unusually prone to suffer, for some special reason that does not always appear, and is rarely developed entirely until the earlier stages of life are past.

If I have any one suspicion as to the original cause, it is that of a syphilitic taint, leading to the nervous irregularity. The fact that the seizure is so much more frequent amongst men than women leads, in some degree, to this view, against which, however, it may be argued that men, although they know nothing of the pains of child-bearing, have other cares and anxieties not belonging to the opposite sex. But the best evidence is that some men who suffer from angina have been subject to syphilis, more or less acute in character. It is, in fact, very rare to meet with a case in which syphilis can be altogether excluded ;

while it is certain that amongst men who are entirely free from the taint, the disease is rare, whatever may have been their troubles; their previous embarrassments, or their diseases. In fact, it looks as if the anginal symptoms often followed the specific malady; and I doubt if any one has seen a distinct angina pectoris in a middle-aged person free of a trace of a preceding syphilis, hereditary or acquired. I may have done so, but it has been an event of very rare occurrence.

I do not know that I have any more to say at this time as to cause. But I am satisfied on these points, which I wish specially to state, that the disease, angina pectoris, is a disease of itself, a disease of the organic or sympathetic system, as epilepsy is of the cerebro-spinal system, and that special disease of other organs, such as the heart, and the vessels connected with it, is purely coincidental.

CONCURRENT PHENOMENA.

Although advancing what may be considered a new and special view on the cause of angina pectoris, and urging that it is a distinct disease, it is right to mention certain concurrent phenomena which ought neither to be altogether omitted nor necessarily connected closely with the disorder. In a gentleman, who was fifty-four years of age, who had suffered much worry, and in whom the characteristic seizure was well marked, there was a permanent and distinct aortic murmur. I do not specially dwell on this, but would notice two concurrent phenomena which were peculiar. The seizure, as a rule, came on in the night, lasting for some minutes; and it was always attended by *free perspiration*, and by *a degree of giddiness* on some

occasions. The perspiration always betokened relief, as if it came as an exudation, steaming out freely, and feeling warm on the skin. With proper care, the patient I refer to was allowed to go to Switzerland, but not to climb, nor subject himself to undue fatigue. He was deprived of alcohol, of which he had partaken rather freely, especially when a seizure began. He improved very much under this line of treatment, and made a fair recovery, with occasional slight recurrences. I believe him to be still alive, although twenty years have elapsed since I last saw him.

In another patient, a man of fifty-eight years of age, who had no history of gout or rheumatism, who had not himself suffered from acute disease, but whose father had died of intemperance, and whose mother was short-lived, the seizures were extremely violent. They came on frequently in the night, the hours of sleep rarely exceeding four. The memory had become bad, and he, of an excessively nervous temperament, rarely had entire relief for twenty-four hours, the intercostal spaces being the chief seats of pain. The peculiarities I most noticed were two. One was an *extraordinary whiteness of the tongue*, but without any coating upon it that caused anxiety; and the second was a *sudden and excessive excretion of urine*, so that as the attack commenced, urine was discharged from the bladder in quantities of a pint at a time. The urine was free of albumen or sugar, but contained phosphates. There was occasionally eructation of gas from the stomach, with pain. This patient lived six years, but never recovered, and died finally from continuous attacks and emaciation.

In a third case, which for some months engaged attention, the patient was fifty years of age. He was

by occupation a commercial traveller, and he was of a marked nervous temperament. His father was a very corpulent man, who had suffered from heart disease, from which he died at sixty years of age. The patient himself had not suffered from anything painful except toothache; he never, in fact, had suffered from any acute disease, but complained much of anxiety of mind, and always was troubled by the effect of travelling. He had been a temperate man, as he thought, in regard to alcohol, but had been a very determined smoker. He first began to feel pain during the night, waking suddenly with the symptoms of angina. The symptoms were most characteristic, and they were, he declared, invariably excited, either by *flatulency* or *indigestion*, due to the pressure of a badly digested meal. At first the acute symptoms passed entirely away when the flatulency ceased, or the meal seemed, with some looseness of the bowels, to have been digested. After a time relief ceased to follow the action of the bowels. At the moment he came to me he was never perfectly free from the pain, which was often terribly severe, attended with coldness of the surface of the body and a sense of rigidity of the limbs. The peculiar and concurrent parts of the case were; one, a *constant flatulency*, the other *an extreme intermittency in the action of the heart*, the last named being always most distinct on quickened movements, such as rapid walking, and which never failed to increase in the act of sitting down. If the patient stood quite still the circulation became even; or if he were put into the recumbent position his pulse became even, but on movement there was immediate irregularity. Also when the phenomenon of intermittence appeared there was a sharp systolic murmur which was much inten-

sified by exercise. The pulse numbered eighty-four, was watery, and easily compressed. The urine was free of foreign product, but was often copious and pale, and the skin was dry. The sight was usually clear; but sometimes large cobweb specks were troublesome.

By completely stopping the smoking and the use of alcohol this gentleman under the influence of steel and digitalis distinctly improved, and on his last visit to me exhibited neither intermittency nor murmur, even in the sitting posture; I learned, however, from the physician who regularly attended him that, without obvious reason, the attacks became more severe, as the weather grew hotter, and that in June, while in the summerhouse of a neighbour's garden, he suddenly died from angina.

In the case of a gentleman of middle age, the symptoms, which had advanced slowly, were at times well marked, with one peculiar concurrent symptom, which he called *pins and needles*, in the lower limbs, following an attack. The time during which this one particular symptom occurred would sometimes last for three hours, and was specially felt in the lower limbs, causing considerable pain and restlessness. The tingling never came on until after a seizure, and was always attended with a sense of numbness and coldness, precisely the same, he said, as happens when the "funny-bone" is pressed upon. He also said that when the seizure was on him, he ejected urine from the bladder, without any knowledge of the occurrence until afterwards, although the bladder was charged. This patient died under a sudden severe seizure.

As important concurrent symptoms I have now recorded the chief that I have seen, but I have a few times noticed slight palpitation of the heart, not always

in the same patient. The symptoms most important, therefore, have been *free perspiration, giddiness, pallor of the tongue, excessive secretion of urine with spasmodic ejection of it, indigestion, intermittency of the circulation, and acute tingling pain in the limbs*—"pins and needles," so-called. With the exception of the last symptom, which may have been due to the long withdrawal of blood during the seizure, all could possibly be originally traceable to other causes than angina, and have nothing more to do with the attack than to complicate it. The attack itself stood alone when once it was excited, and indicated one prime cause, astonishing me as to its unity. I have known it go on for years. One patient who had been originally a colonial surgeon and who came to me first on June 8th, 1875, was under my care for over fourteen years. He lived a good part of this time at Ramsgate, and frequently travelled to London to my house. His symptoms were invariably those of anginal chest seizure, and usually were induced by too active exercise. They did occasionally come on in bed during the night, or in the early morning. At times there was in him a mitral murmur which appeared to follow the attacks for short periods, but all the functions were normal, and he was a most regular living man. In one of the acute seizures he suddenly died about his eightieth year. I always considered him one of the clearest instances of the disorder I had ever met with, though I have known several instances in which angina could alone be traced as the leading feature. At times, however, the symptoms are deferred until late in life. One of my friends, whom I did not myself treat, and who, indeed, rarely consulted any one, began to experience slight seizures about his seventy-fifth

year, did not lay up, and for a while continued to follow a light pursuit. He was an active-minded man, and was content to die, if death were not accompanied with severe sufferings unusually prolonged. The last time he saw me he told me all about his trouble, and afterwards leisurely exhibited to me his collection of treasures and books. He said that so long as he kept for eleven or twelve hours in bed, and made life very easy, he existed fairly well; although he had small seizures, which he concealed, in order that he might not alarm his ever watchful friends. But if he walked a little fast, or made any attempt to climb the merest height, he at once had a smart seizure, which he knew must some time end fatally; in this view he was, finally, quite correct.

I had another patient, a retired schoolmaster, for many years, quite eleven, under my care. His first attack came on whilst he was teaching, from which occupation, on my suggestion, he retired. He was once taken with so marked a seizure as he rang the bell of my house, that he had to hold by the rails for a time, and he often had attacks whilst walking out. He died, as did a previous patient, quite suddenly in a summerhouse in which he was reposing.

TREATMENT, PREVENTIVE AND CURATIVE.

The most anxious points which the physician keeps in view, when he has under his care a case of angina pectoris, are the best modes of treatment, either of a preventive or curative character. We must be honest in feeling on this subject, knowing that at our best we are limited in either the preventive or curative power that we possess, even in those examples that are

freest from any kind of complication or concurrent ailment. It is further to be remembered that, when there is no complication, deaths from the seizure, and during it, are by no means rare ; so that we have ever to be on our guard in relation to our prognostic indications. I am myself always candid, and I am sure that it is the best policy, in respect both to diagnosis and prognosis. The concurrent symptoms may call for a special method of treatment, and with that I have not much to do in the present essay. There is something, however, to be done, both in the way of prevention or cure of angina itself, and, with a correct idea of the nature of the disease, more, perhaps, may be done in the future than we at present can effect, although we can do much that is hopeful.

In such rare cases as the two I named occurring in the female subject, and apparently by disease of some acute kind, I do not know of anything that can at once be carried out with an immediate and useful purpose. They are too rapid in their course for treatment ; the rapidity is almost instantaneous, and if we are at hand before death we have not sufficient time at our command. The symptoms are, practically, those of extreme hysteria of a fatal character. In the two cases I saw I attempted in one to relieve by warmth and friction, for the patient could neither swallow nor breathe efficiently. I vainly endeavoured in the second case to set up respiration by artificial means.

In the more prolonged examples there is some hope of cure, though it may be remote, if the patient be young and if the attacks are slight and infrequent ; it is true that I have seen what have seemed to be recoveries. In the case of the medical friend, to whom I referred in the earlier part of this communication,

and who had attacks during the periods of accouchements of patients under his care, there was so marked a recovery that he was able to go abroad, and on his return, although he was never well, he had no angina, and died from a different cause of death. In other cases, in their first stage, where an admitted cause of the disease in the form of syphilis was present, and in which secondary and tertiary signs of syphilis were manifest, unquestionable benefit was derived from full doses of potassium iodide, carried on until the drug had taken a decided effect on the system. I cannot say that every case in which the iodide was applied was equally benefited; but in three examples there was unquestionable relief, and, if I might venture on the term, *cure*, for there has been no recurrence of which I have heard, and the patients, still surviving, are under my cognisance.

When we come to cases of a fixed kind, in which the seizures are of common occurrence, the treatment we have to adopt consists both of a preventive and alleviative nature. We cannot say that in any case we will cure, but we may hope to prevent recurrences, and, when the attack comes, we may oftentimes give relief. I have been very much struck with both these facts, and I feel confident that in several instances life has been preserved for a considerable number of years through the efforts that have been made. In such cases a good deal depends upon the character, I had almost said temper, of the person affected. It is quite certain that affected persons who are extremely nervous, or over-anxious, or subject to passion, are more easily brought under the influence of the disease than are they who are of an opposite nature. Extremely nervous and sensitive persons are exceedingly bad subjects; they feel

the least annoyance acutely, and they commonly have a dread of the attack from which they may suffer. It is the same with over-anxious individuals, and especially with those who are expecting some unfortunate or untoward result. One member of my own profession, who was constantly consulting me, would arrive in the utmost state of anxiety when, it seemed to me, from his story, there was no serious occasion for the worry to which he was subject. After his death, however, I found that an unsuspected trouble which he had brought upon himself, which he continued, and which was an unceasing source of anxiety to him—although he had kept it entirely secret—was the real cause of the outbreaks of the malady, and was, in fact, the final cause of death. Perhaps, too, and more than anything else, passion exhibited on easy provocation, by those who are diseased, affects certain persons, who, though they may be of generous nature and anxious to do their best, are notwithstanding afflicted with so violent a nature that they cannot, even in danger, keep themselves under control. Passion manifests itself in various ways; it may occur from a shortness of temper, from some little cross in the ordinary affairs of life, from special dislikes to men or things, from what are considered adverse circumstances, from pride, but of all things, more than any other, from jealousy. Jealousy is always a fearful master, and I fear I have seen more failures from it, and more sufferings from it, than from anything else in the world. Sometimes the cleverest men are the most jealous, and, when they see a man whom they consider of common capacity rising, as it were, by some accident above his compeers, they know no end to their anger and perplexity; they cannot be convinced that life is a kind of raffle, and that genius

and talent are not always the commanding virtues ; so they give way first to an ebullition of perplexity, and then sink into a sort of gloom, from which they rarely permanently recover. These last are specially bad subjects for angina, and, in point of fact, are very little amenable to any kind of treatment.

To be brief, all these sufferers are in a certain degree of danger, are more easily than the rest of mankind subjected to it, and require to be most carefully tended. I should put the matter in a false light if I said that it was always the unsuccessful who were susceptible, for there are some men who have triumphed, and become in their very triumph, the most important patients ; nay, it may be admitted that their actual successes are the causes of their danger. They are elated by success ; they expect it ; and, when it occurs, it raises them to such a height of ambition that they are unexpectedly seized by what they at first consider is a mere transition, but which is in the end a persistent disability.

MEDICINAL MEASURES.

Whatever class of case may come under our notice, we physicians are called upon to prescribe for the seizures with the hope of ameliorating them, and sometimes with the hope of preventing them, or it may be said, curing them, an apparent result which, as we have seen, is not at all times a failure. We will talk, however, at this moment of relief only ; and there are two remedies which seem to have a very useful effect. Those two remedies are nitro-glycerine and nitrite of amyl. Nitro-glycerine was first brought into use under the name of glenoine, and more recently, as trinitrin. I believe we were first indebted for it to

the labours of Mr. Field, a practitioner whom I remember in my earlier days, and whom I last met at Clevedon, whither I understood he had retired. Nitrite of amyl was introduced to the profession by myself about 1863, at the meeting of the British Association at Newcastle, and in many respects it very closely approaches the nitro-glycerine in its action. For my own part, I am conversant of no other remedies which are so effectual. During the paroxysm, I have usually ordered from half a minim to two minims of what is called liquor trinitrini; but other practitioners prescribe it in the proportion of one part by weight and ninety-nine parts of rectified spirit, while others use it in combination with oil, in the proportion of one per cent., giving one to two drops for a dose. It has also been used in tabellar form. Nitrite of amyl was first introduced by me as a liquid, to be inhaled in doses of two- to five-minim drops; and if I am right, Dr. Lauder Brunton, who prescribed it specially for angina pectoris about 1867, administered it by inhalation. Later on, I made it into a mixture, so that it could be taken by the stomach slowly, and I think now with better effect than when it was inhaled, because it seems, when swallowed, to act favourably on the whole course of the sympathetic nervous system. As a mixture, I have usually combined it with glycerine, putting three minims to a drachm of glycerine, adding three drachms of water, and ordering that quantity to be taken at intervals in the course of an hour, diluted further with an agreeable quantity of water.

The effect of both the remedies described above is often strikingly beneficial. The action of them is to take off blood pressure, and relax the arterial system, so that blood can flow more readily through the lungs,

through the heart, and through the general circulation. I fear neither remedy exerts a true curative action, for if it did we should really cure, whereas, as a rule, we only give relief. Even in cases that recover, we cannot say that these remedies cure, but they certainly relieve. Thus, in the case of the medical friend to whom I referred as seeming to recover, who went abroad to return with another malady, from which he did not recover, the nitrite of amyl, used by inhalation, relaxed the spasmodic condition so determinately, that he carried the remedy about with him; and often during his midwifery practice, when he felt a seizure coming on, would inhale the remedy with the most striking relief. In the case of the schoolmaster to whom reference was made, and who was under my care so many years, the same happy results followed inhalation; and without prolonging the story, I do not think for the past twenty years I have had a patient under my care with angina who has not benefited, more or less, by the scientific use of the two medicines here described. Further, I have never known a death to take place, nor any injury from their administration. Some patients carry one of these medicines with them invariably, and learn how to use them with singular advantage. My friend Mr. Charles Smith, of Brighton, had a patient under his care who would have a seizure two or three times in the night. For him, Mr. Smith had made, by Messrs. Krohne & Sesemann, a very beautiful little instrument, which would stand on the table by the bedside, and from which the patient could inhale a graduated dose of the nitrite when it was required. Mr. Smith presented me with one of these inhalers some years ago, and I have often found it eminently useful.

We must concede that it is to the anti-spasmodic action of these two remedies that the immediate relief follows, and they should never, I think, be omitted. It is necessary, however, at the same time to look very carefully into all other details in respect to medicines. Sometimes a specific like iodide of potassium is advantageous. Sometimes steel, or quinine, or an alkali, or a diluted acid may do good; as every practitioner will be prepared to advise.

GENERAL MEASURES.

Together with the above medical methods, there must always, in angina pectoris, be most careful suggestions as regards modes of life. As a strict rule, persons liable to attacks of the malady must be freed from excitement, from passion, from fear, and from everything that causes fatigue, and what is called nervous exhaustion. If it can be done, patients of this class should undertake no active duties, should have plenty of sleep, and should be moderate in exercise, avoiding specially climbing, sharp riding, rowing, swimming, cycling, and active games. They are better on level ground for taking moderate walking exercise, and they may ride in the carriage. In fact, it is good practice for them to exercise the muscles moderately; they act wisely in taking light meals, and four light meals a day, of equal quantity, are better than indulgence in one heavy meal. Indeed, I think I have more than once seen a fatal attack after a heavy meal. They ought, also, to avoid evening and night movements, since some are seized in the course of the evening, when they should be in or going to bed. Of all things, they should avoid political and public efforts, and should not allow

themselves to be for long periods alone, or charged with any brooding care.

There is only one other point to which I would call attention. It is a very common practice amongst those who suffer from angina pectoris to conceive that a very free action of the bowels is every day necessary. They are troubled rather easily with flatulency, and they are wont to experience symptoms which seem to them to indicate hysterical derangement. This leads them to fly too readily to relaxing remedies. I quite agree that the bowels every day ought to be relieved. But this should rather be done by dieting than by medicine; and every kind of irritant on the alimentary canal should be as far as possible avoided as a dangerous practice, leading not infrequently to general irritability, feebleness, and seizure.

WORKING-CLASS SANITATION.*

THE facts we have before us show that we have at this time a certain mortality. The mortality may be taken at eighteen per thousand. One hundred years ago it was nearly double that, and fifty years ago it was twenty-four to the thousand; but it is not low enough. We want it brought to an average of nine. There are certain days of sickness amongst our people. There are from thirty nine to forty cases of serious sickness for every death, and there are no fewer than one hundred and twenty-five thousand preventable deaths each year. These, Mr. Wilson Noble, M.P., estimates, yield four and a quarter million cases of preventable sickness. On an average each of these cases of sickness lasts a little over eighteen days, which means an annual loss of over seventy-eight millions of days of work; and if this be taken all round at a loss of two shillings a day, it means a loss of over seven millions of pounds a year. In addition, it has been estimated that every working man loses twenty days a year from exhaustion incident to un-

* Address delivered to the working classes at the Manchester Sanitary Congress, April 26th, 1895.

healthy causes. Lastly, on this head, an excess of deaths is due to errors in occupation which all should understand. What we sanitarians want is to bring these disasters to a lower level. We want to halve the deaths. We want to halve the days of sickness. We want to reduce the irregularities from occupation. We want to see a longer life. At this time we have forty-two years as a high average. We want to raise it at least to that of the Society of Friends—fifty-eight; but it ought to go considerably higher still. There can be no one here who does not wish to assist in this work, and the objects it is striving for; and everybody can help greatly. It must be every one's wish to know not what can be done in all ways, but what is the most pressing and possible, and particularly what the individual can do. The true sanitarian desires most immediate aid in as follows :—

1. He wants four orders of cleanliness—cleanliness of a personal kind, as in dress ; cleanliness in food and drink ; cleanliness in the air breathed ; and cleanliness in the home. These various assistances ought to be explained with much care, showing how every individual should exert himself to get baths and laundries introduced into the neighbourhood in which he lives. Laundries ought to be under the direct management of the municipal authorities, and the washing of clothes ought to be performed with the utmost cheapness. No profit would ever be made, out of that process, if health is to be considered the first necessity, for the laundry, as it now exists, is one of the most fruitful sources of disease ; for health will not be clothed in dirty raiment. All should insist on the cleanliness of food and drink. Food is

a constant bearer of uncleanness—in animal food, in bread, in vegetables, and in fruit. In every market, for the sale of these foods, there ought to be the most perfect inspection, so that the poor going out to buy food under imperfect light should not be injured by what is sold them. Water, which is the one necessary, the only necessary, drink, should of all things be pure. It makes up sixty-five out of every hundred parts of the body, and it is subject to frequent pollution unless it be rendered and kept pure on the largest scale. It ought specially to be in the hands of the municipal authority, and every working man ought, through his vote, to insist that the well-spring of life should come to him free of all risk of conveying disease. Cleanliness of the air breathed is an equal necessity. The air is charged with the dust and refuse of streets, with foul emanations from sewers, with foul smoke, and every man should do his best to prevent inhalations of this kind. He should support those who wish to bring fresh air into towns and villages; who pave the streets with hard wood, so that fine particles of sharp dust do not fill the air; and, who take care the nose is not offended by the taints of decomposition. These are municipal duties; but there are the duties also at home, where cleanliness is dependent on the man and the woman. Cleanliness there means knowledge and habit. It is as easy to be habitually clean and orderly as to be habitually unclean and disorderly. Above all, keep most cleanly those parts of the house which usually are left most neglected, the water-closets and back-yards particularly.

2. A second assistance which the true sanitarian requires is attention to eating and drinking. Let it be remembered that the tendency of man is towards

gluttony rather than starvation. Under the most ordinary care it is really difficult to starve, but it is the easiest thing to gluttonise; and far many more die of surplus than of want. The vegetarian system is much to be recommended, though it requires modification to make it always suitable. Fruit, now so cheap, is amongst the best of foods. Apples are good, and in some sense the banana is one of the most sustaining, as it is one of the pleasantest, of foods. As to drinks, there is no subject yet in which so much is required of assistance in their selection. There is only one drink required; there is only one drink that fits the organism, and that drink is water. Alas, in our ignorance,—in our belief that we can cross the designs of Nature, we saturate ourselves with strong drink which keeps up death in our world, and almost all our woe. Avoid that in the home and out of it, and you will become sanitarians of the most practical kind, and of the first order.

3. A third point in which we sadly require individual assistance in sanitation is in the matter of occupation. This concerns none so much as the masses themselves. They require specially to observe the effects of occupation on health and life. They often stand in their own light here, and embarrass the reformer. One amongst many striking instances of this is the opposition to means invented for preventing the entrance of dust into the lungs in some factories, as the lines of Ebenezer Elliott, the Corn Law rhymers, so powerfully show. No men could assist so much as working men in watching the effects of occupation, and none could so ably enforce the propriety of constant supervision of health laws. If a man falls from a scaffold and is killed, any fault of the employer is criticised, and

a remedy sought. But to one who falls in this rude way a million are injured by other and equally severe and removable causes, because the workmen do not see them. We want you to help us here with your eyesight. Let the masses learn to see correctly, and they will be of the utmost use to themselves and the rest of the world.

4. One other matter remains: we want your aid in practically determining hours of work, and not those hours alone, but hours of recreation. We think, as a general rule, not without several exceptions, that from eight to nine hours daily of one kind of work is quite sufficient; and it seems to us that work done with the body as well as the mind tired is not good work. But we wish in recreation, allowing good eight hours for meals and sleep, to give to mind and body such change of pursuits as shall call into best play all the senses, cultivate the best muscular efforts, and enlarge and charge the mind with the best thoughts and deeds. Games of precision, good reading-rooms, choice selection of books, travels from home, cheap journeys into other countries, wider communion than hitherto with other men and manners,—these are the aids we ask at your hands, knowing that as they are ours they will soon be yours also if you once adopt them, and that what we teach as strange teachers now will be commonplace when your sons and daughters are, as they will be, the children of light.

It is really impossible to foresee what good sanitation would do for the working classes; it would elevate them beyond anything that has ever been attempted by them in their dreams of progress and improvement. It is becoming now manifest to every one that health is the first messenger of peace and prosperity; and so

advanced is he who is always well that no one is able to compete with or to be above the person who is provided with a good constitution of mind and body. The healthy man, in short, is the strongest man; and the healthy woman stands even in a better position, for she becomes the mother of health, and passes it on to those who are born from her in continued line, her own self extending through the ages. The woman, therefore, is as good to the ages which she renders healthy as she is bad to the ages she renders unhealthy. She lives to be healthy for the sake of those who succeed her.

A father and mother, though poor, are positively rich when they have a healthy home. I know it is a struggle to combine together health and poverty; but it is a thing to be done, and it is done with comparative ease when, apart from mere changing fashion, it is detected on what a few ministrations health depends. I dwell once again on cleanliness as a first march of intelligence, and hold that as all persons can be clean as easily as they can be dirty, if they take the clean position, they have won largely in the battle for health. All persons can be clean, even if their occupation be lowly; they can have clean clothing, which tends to their mental and bodily improvement, and can clean themselves. I repeat what I have before said, that health will not be clothed in dirty raiment; yet how often is it that men, and women too, seem to think that the dirtiest garments befitting their work are the garments they must wear almost night and day, as if what they do must always be the most distinctly manifested! The body is clean or the body is dirty, and the clothes match. I believe this is universal as a combination, almost as if the outer garments were an actual part of the garments of life. When the working man and woman appreciate

this fact in its fulness, they will advance a generation at one movement. It will be their task to know that, wherever they reside, the authorities there must provide them with every means of cleanliness; baths must be erected for their use at every available spot, and laundries must follow, as the complement to the bath and to the household. Above all things let it be remembered that it is hopeless for those who are fortunate enough to be above poverty to render aid to sanitation, if they are not themselves, as far as they can be, the leaders in the work they set themselves to perform, and take the place of patterns as well as of guides.

OPUSCULA PRACTICA.

"There are mites in science as well as in charity."

BENJAMIN RUSH.

LETHAL DEATH IN PAINFUL DISEASES.

HE *New York Medical Journal* for September 21st, 1895, has a paragraph on what it calls "Euthanasia by Homicide," and in which it says that, at the Medico-Legal Congress lately held in New York, it was implied, if not directly stated, that physicians often killed patients deliberately in some merciful way, when they were suffering from inevitable fatal disease or injury. One speaker found no fault with this alleged practice, but rather commended it, as well as the destruction of newborn monsters, which was also said to be resorted to by physicians. Such practices, it was stated, especially that of taking the life of monsters, had occasionally found advocates among members of the medical profession, but had never been sanctioned by any representative body of medical men; indeed, they had been utterly condemned by the great body of the profession, and physicians all over the world would resent any statement to the contrary, no matter if it were made approvingly. The writer supposed:—"That there are conceivable instances under which it would be justifiable to kill a person for his own sake; but these are no more apt to involve physicians than persons of other

occupations. Medical men aim to prolong life ; they do not destroy it because it is painful to such a degree that the sufferer thinks he would prefer death."

This paragraph brings to my mind a case which occurred to myself, in which the facts were of singular import. The late Mr. Jervis asked me to go to an hotel, not far from here, where he was attending a patient, in conjunction with the late Mr. Cæsar Hawkins. He wished me to go without him or Mr. Hawkins, but I declined until Mr. Hawkins himself sent me a short letter to the same effect, and in which he pressed me earnestly to concede. I was informed that the patient was suffering from malignant disease of the throat, and had taught himself to administer chloroform to himself with the intention of relieving pain, or, if it so happened, of destroying life. It was felt that if he destroyed life, he would be guilty of suicide, and that not only would the feelings of the family be harrowed, but that there might be a dispute about property in the administration of the estate. The patient had read my edition of Dr. Snow's work on "Chloroform and Anæsthesia," a work that was then attracting a good deal of notice, and he wished to see me, hoping that I would ratify his treatment, while the others, including both practitioners, trusted that I should have influence enough to stop him. On my visit, I found a deep, wide, malignant ulcer at the back of the pharynx of the sick man, involving a pulsating vessel, which could be seen pulsating. The patient enquired of me how long he should be likely to live, and if an operation were possible. I was obliged to confirm what my predecessors had said—namely, that an operation was impossible, and that death might be imminent from the rupture of the vessel, whilst,

unfortunately, it was certain under any circumstances. He, then, lying down in bed, took up an inhaler which he had primed with chloroform, and put himself to sleep, on which the inhaler fell from his hands. It seemed a very happy sleep, and I watched him for half an hour or more. On his recovering consciousness, he explained that he had no other mode of relief; that he could not swallow properly; that he spoke with difficulty, but was soothed at once by the chloroform when he inhaled it, whilst any kind of medicine, administered by the mouth, produced much intense pain, that he would rather die than bear it. I explained to him all the difficulties, proposed hypodermic injection, which was not very well known at that time, and injected him twice with morphia, but without affording the same relief as he had obtained by the chloroform. He said that he had used the chloroform for seventeen days, and that, according to his own judgment, the ulcerous surface had contracted, and was much less painful, so that he could swallow better. I went several times, and myself administered the chloroform, but in spite of everything, he not infrequently got it for himself, and slept under it for the greater part of day and night. This went on for three weeks, with a skilled attendant; and, I am bound to say, as a matter of precise fact, that he improved. I have no doubt that contraction of the open surface occurred; that the pulsation was not so marked; that he spoke better and more cheerfully; and that he swallowed better, more freely, and with less pain. I should have been content to go on with the treatment, being deeply interested in seeing how prolonged sleep would act in such a case. Also, I lost any dread that death would follow the application, and I was given to feel that if I were exactly

in that man's state of hopeless misery, I should like to be treated precisely in the same way. He was removed, however, from our care, taken to some health resort, was there peremptorily refused the chloroform, and in about four weeks died from pain, sleeplessness, inability to swallow food, and the consequent exhaustion, with wide extension of the malignant mischief.

The question is:—What is the right thing to do in an extreme case of this kind? I hold tenaciously to the general opinion of the profession, that it is best not to recognise what may be considered slow suicidal attempts, but I think the plan carried out by this patient was justifiable. It was so on all grounds, and it was, perhaps, consistent to attend to the wishes of a patient in such a dilemma. But what was most important was the circumstance that the method seemed useful, and straightforwardly was useful, as a mode of cure. Menander said that all diseases were curable by sleep,—a broad statement, in which, nevertheless, there may be something that is true, for good sleepers are ever, as I think, the most curable patients; and I would always rather hear that a sick person had slept, than had taken regularly the prescribed medicine during sleeping hours.

RECOVERIES AFTER STERCORACEOUS VOMITING.

THE phenomenon of recovery after stercoraceous vomiting without operation is evidently much more common than I once saw reason to hope for. My friend Dr. Norman Kerr has referred me to five cases of the kind which he published in the *British Medical Journal* in 1878

(vol. ii. p. 307). One of these recoveries was in a woman 68 years of age ; another in a woman of 42 ; a third in a man of 34 years, after five hours of the vomit ; a fourth in a woman of 78, after eight hours ; and a fifth in a woman of 58, after seven hours. The first-named of these examples was so near to death that the last rites of the Church had been performed. The treatment adopted by Dr. Kerr in these cases consisted of the administration of large doses of belladonna, after five enemata, with purgatives, and with fomentations to the abdomen—modes which I have followed, but not with the same happy success. The question is a very perplexed one. The point in diagnosis must, on the whole, rest on the cause of the obstruction. Is it possible to diagnose between spasm, an accumulation, a band round the intestines, an involution, a knot, or an adhesion ? The antecedents of a case may lead to some correct evidence in a given case ; but we are apt to be deceived very often, even in the midst of the wisest counsellors. I was once called into consultation in a case of the kind under consideration by the late Dr. Platt, and we had the assistance of two of the ablest men we could have on such a count—Mr. Curling and Sir Spencer Wells. We all considered the matter from every point of view, and the most we could suppose was an obstruction from adhesion in the descending colon. The seat of the pain and the physical examination led alone to this conclusion. In the hope that a young patient might recover—for it was a young patient—we decided not to operate. The result was a sudden collapse and death ; and at the post-mortem we found no fewer than three points of obstruction, one in the descending colon as suspected, another in the lower part of the ileum, and a third higher up in the small

intestine. If we had operated, we should have found the lowest obstruction, should possibly have been satisfied at the time, but should have rendered no service.

In an opposite instance there was every reasonable evidence that the obstruction was clearly detectable by the finger through the fore part of the abdominal wall, and we did all we could to influence the relations in favour of an operation, as was most reasonable. The friends—mainly on a religious prejudice, for it could not be called an argument—refused flatly; the sufferer, after a lingering illness of some days, died; and at the post-mortem we discovered a small band, not thicker than a wedding ring, surrounding the small intestine under the exact spot we had predicted, and where, had we operated, we could have most probably removed the cause of death.

With such conflicting evidence, it is still an open question whether stercoraceous vomiting is not the safest sign in favour of operation. A quarter of a century since there could have been no argument; the operation was so formidable. Now, however, operation has lost so much of its formidable character that we live, as it were, under a new surgical system, and certainly, though we may waver in opinion, we ought not, if we can help it, to let any one die without giving a chance of a recovery under operation. We are brought down, therefore, to the proper time, the proper period, and the comparative danger that may warrant the attempt.

The question that is vital is the cause of death during obstruction. It is sometimes shock, sometimes the death and putrefaction of the intestine with absorption of putrescent fluid from it, sometimes absorption of

intestinal fluids or gases into the blood. It might guide us if we were able to diagnose these three conditions from each other. In the case I narrated in the last ASCLEPIAD, it was absorption of intestinal product that caused the danger; and no doubt the process of well washing out the stomach adopted by Dr. Collins had much to do with the good results which so happily followed without operation. From this, as from a preceding similar case, in which I ordered the same methods with like fortunate results, we ought to make it a rule never to operate until the stomach has been well washed out, in addition to all other reasonable measures in the way of enemata and purgatives of an appropriate character. In examples of a spasmodic type there is good reason for adding belladonna; there is no physical contradiction to it in any instance of an acute nature; and its relaxing as well as its soothing influence is a sound therapeutic measure.

On the present occasion I venture to mention a suggestion, diagnostic chiefly, on which I should like others to observe. It seems to me that putrefactive change in the intestinal tube is specially indicated when there is peritoneal distension of a marked kind, whether there be or be not stercoraceous vomiting; but that stercoraceous vomiting with no abdominal distension indicates that the structure of the intestinal canal is free of decomposition, is still living, and is capable of resuming its work if the direct cause of obstruction can be removed. This might, therefore, be a guide to us in very doubtful cases. We should afford relief to distension by an operation, and we should not be likely to inflict further injury than exists.

ON THE MANUFACTURE OF NEW FOODS.

 WAS asked a short time since to deliver a brief address to the Royal Society for the Prevention of Cruelty to Animals on the above-named subject, a duty I had the pleasure of carrying out. I began by explaining that the object in view was to treat vegetable products so as to convert them, as foods, into such a condition, physically and chemically, that they should convey all the qualities of animal foods for the sustenance and warmth of the body. I described the various considerations that had led me to propose originally, several years ago, the possibility of producing foods of this character, and related the details of many attempts to carry out the intention. I held that the proposition of making organic products out of inorganic matter was premature, might be incorrect in principle, and was certainly very complicated. But when a spell of this kind was broken it was a comparatively easy task to transmute one kind of organic matter, vegetable and mineral, into another kind that should be practically animal. In plain words it is unnecessary to make herbivorous animals the laboratories for foods.

To flesh feeders, meals prepared in the laboratory of the chemists are more than equal in matter of quantity, equal in quality, equal in taste, and could be constructed with infinitely greater economy than now exists.

The next point argued was that by chemical research we now know, with precision, what the elements and compounds necessary as foods for life really are. We could theoretically construct foods that should perform

every necessary purpose for the body of man in every season, and under all varieties of rest and work. If then we could practically construct foods, so fitted, we could transform the art of feeding into an art that would develop an ideal system and a more perfect race. This was dwelt upon strongly, and it was urged :—

(1) That foods prepared in the way named would not fluctuate in supply under adverse seasons and blights.

(2) That such foods would not be dependent on the endless losses and cases of disease which now attend the breeding, nursing, and tending of animals.

(3) That such foods would be free of all the dangers of disease incident to the necessary diseases of animals, and which become many times a source of danger to the human family.

(4) That innumerable forms of cruelty to the lower creation, which seem to be inseparable from the system of living on animals, would be entirely removed ; a most important reason for the support of such a society as the Royal Society for the Prevention of Cruelty to Animals.

(5) That food supply would be reduced to a science, applicable to every age of man, every condition, and every nation.

(6) That the foods, made in the manner described, would be altogether assimilable by the body, leaving, by necessity, no constituents that had to be excreted from the body. The strength and activity of the body of man would thus be conserved, as it is in pure carnivorous animals, like the lion, without the loss which occurs in the secretions met with in herbivorous animals that find a huge expanse of digestive apparatus necessary.

(7) That although the business of the herdsman and

cattle-farmer might be finished, a wide-spread new industry would be established in which, in food mills scattered throughout the land, millions of people would find labour for turning out abundantly the foods that would be served at our tables, at moderate cost, at a minimum of culinary labour, with endless possibilities of administering to the tastes and elegancies, and with the advantage of rendering substantialities of sustenance for body and mind.

(8) That, compared with pure vegetarianism as at present developed, the new foods prepared would prevent much labour which that system, advanced as it is, puts on the human digestive organs. That it would make them resemble the simple digestive system of the pure carnivorous animal rather than the elaborate and large digestive systems of the herbivorous class.

(9) That as vegetables, fruits, and herbs would form the basis of the new system, a more advanced and extended field of horticulture would be developed and sustained, so that land cultivation would be far more fully carried out than it is at this present time.



THE POSITION OF THE BED FOR SECURING THE BEST SLEEP.

IT is still an unsettled question how a sleeper ought to lie in respect to the course of the earth as it rotates on its axis. Should we lie down in the line of the axis or poles, north and south, or should the body rest with the head across the axis, that is to say, with the body lying east and west? As a general rule, I fancy, builders lay the joists of a room as nearly as they can across the windows; and the boards over the joists, in the same line as the windows;

there is a common fancy also amongst housewives to place the bed parallel with the boards; then the sleepers are made to lie either in the line of the axis, the head directed towards one pole, the feet towards the other, or across the line.

The question is whether it be best for the body during the long hours of sleep to be revolving with the earth, or across the axis. This must be an important question. Again, is it best if one lies across the axis for the head to lie towards the east or west? Shall we, or shall we not, lie so as to go with our heads downwards to the west, and rise with the sun, meeting it in the east? If we go with the head westerly, the motion would be inclined to direct the course of the blood towards the head; if with the feet westerly, it would be the opposite; while if we should lie in the line of the axis due north and south, it would be most probable that the rotation of the earth would produce no special effect on the blood in its course to or from the head. I have, on my own part, tried the different positions, and taking it altogether, I think I sleep most profoundly, and fall asleep most rapidly, when I lie with the head westerly; also that I wake most easily when I meet the sun or its early rays staring at me easterly in the morning; but I am such a good sleeper I dare not be sure on this matter, and the point ought not to rest with me. It ought to be put to proof by very widely spread observers, and it ought to be put to proof specially in hospitals and in other places, where the sick, the sleepless, and the feeble are undergoing treatment.

There is a great deal to learn on this subject in the matter of treatment. Once, in one of our great institutions, a man invented a revolving wheel, in which the body of the patient was placed with the feet or the

head directed to its axis, so that in various cases either centrifugal or centripetal force in regard to the head might be established when the rotary motion of the wheel was started, the course being made to differ "according to the nature of the case," or, more correctly, according to the fancy of the prescriber. The art was rude and vulgar enough, and in the end was dispensed with, because of the discomfort and pain it sometimes wrought, and because, as I was informed by one who was reliable and who had looked at the process, no good whatever was traceable to it, but some evil, because "it was really an instrument of torture." There is to be gained from it, however, this lesson, that long position of the living person on a revolving body, in course of persistent revolution, must have an effect, which we should become definitely acquainted with, and make it a clear and good fact in our practical management of life.

ACTION OF SODIUM ETHYLATE.

NMET with a slight accident a few months since which, though easily remedied, should be named, because, with the care it teaches, it is preventable. A child, having a large vascular nævus on the back, was brought to be treated with sodium ethylate. In the usual way I painted the nævus freely over with the solution, and after a few hours a firm and thick crust was formed. Three days later I removed the loose portion of the crust and laid on another coat, upon which a second firm crust presented itself, and the vascular mass might have been considered as quite destroyed. Unfortunately, one of

the relatives in nursing the child hugged it closely against her stays, causing the crust to rupture quite across, and its two sharp edges to cut deeply down into the surface beneath. The cut surface bled, and when next the child came under my observation there was an open, deep wound which had to contract and heal up, during which there was return of the original growth.

When the surface had closed up by healing, the whole of it was once more encased in the ethylate, and the recovery was as good as could be desired.

The lesson of this little accident is that when a crust has formed from the action of the ethylate of sodium, pressure upon the crust should be carefully avoided by those who attend to the patient.

There is another matter to which I would direct attention. I see that some, in writing about and treating with the ethylate, speak of it as if it were a destroyer like nitric acid, and conceive that it is necessary to surround the *nævus* with strapping or other covering, so that the fluid may not run over on to the sound parts. I should like here to add that any such similarity between the ethylates and nitric acid does not for a moment obtain, and that the experiments which led me to introduce the sodium and other ethylates for their important practical services to medicine suggested nothing of the kind. I observed, originally, that whenever the ethylates were subjected to the action of water, the water was decomposed; that the oxygen of the water united with the metal present, sodium or potassium, converting the element into a caustic oxide, and that the hydrogen passed to the ethylic part, re-converting that into alcohol. Applied to a blood-tissue like a *nævus*, the same takes place; the oxygen of the water of the tissue combines with the sodium or

potassium, producing caustic soda or caustic potassa, whilst the hydrogen leads to the reformation of the styptic alcohol. The nævus is broken up by the caustic produced, and the whole, coagulated or fixed by the alcohol, becomes a crust, which remains as such, like a scab in the healing of an abraded surface. In the formation of a scale or scab, ordinarily something of the same kind takes place in a slow form or degree.

Without the faintest prejudice in favour of the ethylate cure, because it was invented by myself, I must state that I have never seen so perfect a substance for the removal of a vascular nævus, and that in all my experience of it, extending over twenty-five years, I have never had a single failure from its use. It is, however, necessary to re-describe its mode of action on pure physiological grounds, that it may not, like so many popular so-called remedies, drop into silly and purely empirical disrepute. It is a real and easily understood remedy, resting on rational explanation.

ELASTIC TISSUE FAILURE.



AS far back in practice as I can remember, I have been puzzled at the failure of elasticity of the tissues and of elastic movements in the living body. We have been so accustomed to witness such failure that it comes to us as a matter of course. We see the body in its young and elastic stage, and when the back is straight, and the back and limbs move freely, we set the phenomena down as due to the natural elasticity. We see the body when it is advanced in age: it is now stiffened and deficient in its elasticity; it is unable properly to

bend and move ; that elastic power of its lungs, by which they empty themselves of their carbonised air, is less active ; its arteries are more rigid ; its membranes distend and contract less effectively ; its outside covering, or skin, is not endowed with the same rebound. We consider all this natural, and we say age creeps on and death is nearer ; we look, perhaps, upon the absence of elasticity in the lung substance as the most common cause of death ; the cause of the natural anæsthesia by which life is brought to a final termination.

These facts are such every-day occurrences they pass by us, but if we look at the import of them the study is profound. We find this cellular or elastic substance in the bodies of animals, and we separate it as we might separate indiarubber from the tree that furnishes it. It much resembles elastic rubber both in substance and service. So great is the likeness between these two substances that I once, out of the elastic tissue of a bullock's arteries, obtained enough of it to vulcanise it, and got thereby a fabric that could not be distinguished from the vulcanite commonly used for the plates of artificial teeth, except in respect of colour, which is adventitious and readily added.

Why, by age, does the elastic tissue change and lose its elasticity ? This is the question. I confess I do not know, neither do I know why caoutchouc changes. At one time it seemed to me as if the elastic tissue was a gift of birth, and that its wearing out was a result of life ; but on deeper consideration we must see that the tissue is daily being made or separated in the body. We are at all times taking it in foods that are animal and vegetable, or else we are manufacturing it. If we take a specimen of newly drawn blood, whip out the fibrine, and then wash the fibrine until we get it perfectly white, we

find that the fibres are elastic ; even if herbivorous blood is taken for the purpose the fibres are still elastic, so that the tissue is probably made in the body. But how it is made we have no knowledge whatever. Yet what importance is attached to the enquiry ! If we could find a food that supplied the elastic tissue specially, or if we could supply a food that would transmute into elastic tissue, and that did not injure the body, we could, as it were, do much towards implanting a new life, and help towards extending it since we certainly could support longer the contractile power of the lungs and of all elastic structures. This is an art in physic which has to be learned in our future studies.

COUNTRY PRACTITIONERS.

WHEN I was recently presiding at the Temperance Congress at Chester, one of the speakers made an observation, which seemed to convey that country medical practitioners are not so sound and reliable as those who reside in towns and big cities. I thought it necessary openly to correct this impression, and expressed what I felt to be the fact, that the common error about country practitioners is not true. I repeat here what was then said, that there is no difference between country practitioners and their compeers in the cities. The country men seem to have laboured under some disadvantage from the circumstance that they have not been able to meet together in societies, and to deliberate often on the science and practice of medicine. If that be so, it is not any real disadvantage. They meet, it is true, less fre-

quently; but they have more time to think over the matter that is before them; there is more novelty in the act, and they probably pay closer attention to the subject under study, combining that which they see with that which they have read. As to practice in the country, it is just as varied and important as it is in town; and as to its practitioners, I believe, from a very long experience, that they are quite as good as any other. When I was a young man I assisted for a time a firm of practitioners in the midland counties, one of whom, the late Mr. Dudley Hudson of Littlethorpe, was, taking him all in all, one of the best of doctors I have ever seen. He was an excellent diagnostician, a sound therapist, a microscopist, a first-class operator, a good physiologist, and the possessor of foreseeing and prognostic faculties, the equal of which I do not remember. From all I have observed since—and it is for quite fifty years—the class of skill amongst our country practitioners has been, as a rule, of admirable character, and I could name numbers of them, if necessary, who have maintained the highest positions.

There is some justice in the statement that, owing to the fatigues of practice and silent responsibilities, the country doctors are a little too much disposed to the use of alcohol; and, indeed, I have been consulted by not a few of them about it, while I have seen some die from it. This is a pitiable knowledge; but ideas are changing now, and that grand source of strength, *total abstinence*, is extending amongst them as widely as it extends in other communities.

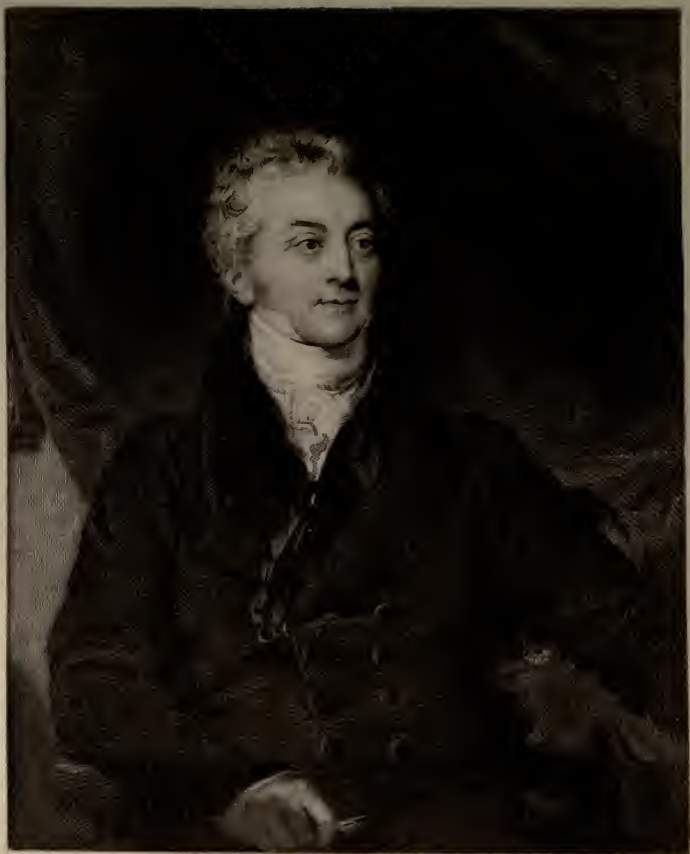
HEREDITARY ABSTINENCE AND STRONG LIFE.

THERE are two currents of progress in the abstaining reformation—the current that ebbs and flows and is visible to the eyes of men, and the underlying current, that prime and princely spring, on which all our hope in the future rests. Except they are touched by the artificial rhythm of bad heredity, all our newly-born, ignorant of the misery emanating from the alcoholic fire, are sound until they swallow that fire. They are active, vigorous, engaging, observant, happy; they work, they play; they do it all as water-engines. Why shouldn't they go on doing it? There is only one reason, and that as bad a reason as ever was known, namely, that they are taught by their elders to depart from the way in which they are born to go; they are trained to break eternal law. This is what has been; but here is our hope that they are now being largely trained to keep eternal law. Let but one generation hold its place, keeping the law inviolate, and the whole victory is on one side. The arguments we now hear on the “diffusion of useful alcohol” could never occur to the human mind freed from the training on which a shameful delusion still rests. The arguments about sensations and needs and services from alcohol must cease with the thing that first makes them and then exalts them. Let it be the duty of every abstainer to confer, through free education, the freedom of absolute temperance on every one born, from birth to death. Then, very soon, nations altogether shall rejoice in the strength of the purest vitality, and the innocence of a little child shall lead them.

ANÆSTHESIA AND FATALITY.

THE year 1895 has gone out with a yield of sixty deaths. It has the same record as 1894, and is a fearful charge against us, so fearful that had it occurred in its first days it is doubtful whether anæsthesia might not have died altogether, however beneficent it might be. By some it will be argued that the anæsthetic was different in the cases related, and it must be admitted that there is much truth in the statement, for we find that as well as chloroform, mixtures of different kinds, ether itself, nitrous oxide, a newly-named remedy called pentol, were among the anæsthetics used, and yielded fatal cases.

But, probably from the circumstance that it is more often resorted to than others, and is considered so much more convenient than the rest, chloroform stands above all in regard to fatality, and it has been in the last year the cause of no fewer than fifty-one deaths, and with it, as well as with others, death has been usually a rapid phenomenon. We may consider the forms of death as four in number. One set has occurred through pure asphyxia; a second by a kind of syncope; a third by a mixture of asphyxia and syncope; and a fourth by long continuance of the action of the narcotic. As a rule the rapid, or syncopal deaths have been most common, as if the chloroform vapour told immediately on the heart, through the nervous system; by a quick absorption of it at the ends of the nerves in the mucous membrane of the throat, by the fibres of the pneumogastric, or by the fibres of the sympathetic. The grand point, therefore, in regard to chloroform is to bring it into action as slowly as possible, and in the smallest dose.



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Thomas Young

*Autotype from an engraving
by J. Thomson after a
painting by Sir Thomas
Lawrence P.R.A.*

B.M.R.

THOMAS YOUNG, M.D., F.R.S.

IN the last biographical paper in this journal, readers of it were introduced to a once well-known surgeon in London, named Abernethy. The memoir evoked a great deal of interest, with some remembrances of the man which remain to the present day. I said of him that he was not one of the great ones of physic, but that he was a remarkable man of his time, with some ingenuity and many strange oddities, which told upon the public mind. Referring to a celebration held in his honour during the present year, and which had reference to this centenary, I mentioned that amongst the portraits of other celebrities of his day, there was one of Dr. Thomas Young; but that it was little regarded, because Young himself had gone out of remembrance except to a few individuals. It was the fact that Abernethy was the brilliant star of the moment. Young was as a comet that had appeared for a short time, and had never returned. This is not infrequently the fate of man in this world; but I should be sorry if I lent myself to the same ideal. To my mind Abernethy was a small comet of strange shape, and of little brightness, while Young was a fixed star of our science firmament; the

next man of science even to Newton himself; a man whose name can never be forgotten while there is a science; a worker who contributed to the scientific life of this nation; one who did as much as any other man who has preceded him, and who certainly has never been superseded up to this period, either in England or the world. It may be well, therefore, for us to take a glance at so great and striking an individuality.

Thomas Young became a London man, in some sense a Bartholomew's man, and, perhaps, a pupil of Abernethy's. It is a curious fact in regard to him, that during his time there were two men of the same name, and one of precisely the same name, "Thomas Young," with whom he has been confounded. Of the last-named Thomas of his name, little need be said, because he is very slightly in the way; but the other man, whose name was Samuel Young, was worthy of greater observation. Samuel Young was indeed the possessor of very considerable parts. He was a surgeon who did not scorn to be, in some measure, a general practitioner; and he practised, I should conceive, on a large scale. He seems also to have written pretty considerably; but what he wrote had relation purely to the practical details of the profession; and certainly his essays on medicine still deserve consideration. But he was, after all, simply a practitioner; and he bears no kind of comparison to the great Thomas Young, of whom we are now speaking, and for whom he was sometimes mistaken. Our Young should be confounded with none other; his theory of 1802, on light in colours, rendered as a Bakerian Lecture, and the "law of interference," which he established, were so wonderful that M. Arago looked upon them, not only "as his chief discovery, but something that renders

him immortal," alone sufficient for his lasting fame, if he had done nothing more and nothing less.

By birth Young was a member of the sect called Quakers. His father was a Quaker; his mother was a Quakeress; and although he himself seems to have turned, in his later days, into a Church of England man, and accepted one of its sacraments, he may be said ever to have remained a Quaker in his disposition. There is little doubt that in his earliest days he was taught the true Quaker language, the *thee* and the *thou*, as well as the faith; and we find that he did not entirely forget the language, for though to other people he conversed in the ordinary way, in his letters to his mother he would assume the old method without any wandering strain. We must look upon him in this light, the Quaker blood still in his veins, and must thereby understand that when he *did* a thing, he *did* it, and that there was no compromise in his nature. He spoke what he believed to be true, and held by the truth; for though he was never what might be called a strong man physically, and died early, he had an active mind which knew no demurs.

Young was born on June 13th, 1773, at Milverton, a small town in Somerset, from twelve to thirteen miles from Bridgewater. The town stands in a beautiful valley, and is of a great antiquity. There was connected with it, and I believe still is, a small market; and it remains to this day a notoriety, not only because he, Young, was born in it, but because a friar by the name of John of Milverton brought out, in his time, an attack or essay against the eminent reformer Wickliffe. Young was the firstborn child of a family of ten children, his mother being a niece of a medical man in London of that day who was of great

fame, and whose name was Brocklesby, a name which every one in those days knew, and which Samuel Johnson was very proud to recognise. It is recorded of Young that, from the first, he had a powerful memory, and that he learned the languages of English and Latin so well, that he could recite them before he could understand what they meant, an advantage in a sense, and yet not altogether advantageous. While he was a child he went to school at the neighbouring town of Bristol; but he was not particularly advanced in his studies by his teaching, for it was felt that the teacher was not well adapted to deal with him. It is not very clear how many years he remained ill taught; but it seems that during a vacation, a land surveyor of his own district took a fancy to him, gave or lent him instruments with which to test his skill, supplied him with a dictionary of arts and sciences, probably Chambers', which was the great dictionary of that day, and helped him very much in his early career. From his first school he went to an academy kept at Compton, in Dorsetshire, the master of which was a Mr. Thompson, to whom he seems to have been very deeply indebted and from whom he learned to become competent in the study of the Hebrew Bible in its original form. The Eastern languages were made familiar to him in these beginnings. From Mr. Thompson Young secured also a good education in the first books of mathematics, and in French and Italian, and whilst following these preliminary studies, he began to construct instruments on his own account, making a microscope for himself from Martin's description. In this way he became acquainted with elementary optical phenomena. The story concerning him goes on to explain, that while under Thompson

he also learned from Martin's work something about the doctrine of fluxions, but languages filled his mind.

It is said that when he was fourteen he left the tuition of Mr. Thompson, fairly acquainted with Greek, Latin, French, Italian, Hebrew, Persian, and Arabic ; and it will be understood that from these acquirements his friends formed a very high opinion of his knowledge, judgment, and taste. It was a question to what profession he should attach himself, and some hesitation seems to have taken place, one thinking he was destined for the Church, another for the law, while he, tinctured perhaps by his mother's relationship to Dr. Brocklesby, was inclined to make physic the study of his life. Before he was quite decided he became acquainted with Mr. David Barclay of Youngsbury, in Hertfordshire, the grandfather of Hudson Gurney, to whom, ultimately, he—Young—acted as tutor in Mr. Barclay's house. Here, his health somewhat gave way, and it required all the attention of Dr. Brocklesby and of Baron Dimsdale—the predecessor of the present Sir William of that name—for him to hold his own. He did so, however, and very largely assisted one of his sisters in her studies. At Youngsbury he took up very closely the study of Astronomy, from which he received, as he says, much pleasure, a pleasure he wished to communicate a share of to others. He became acquainted with the great philosophers and poets of antiquity, kept ample notes of his daily studies, and acquired great facility in writing Latin ; composed Greek verses of good quality ; dipped into the higher Mathematics ; and likewise made a study of Botany, Geology, and Entomology—all in those days advanced and laboured acquirements.

As we read these details we are somewhat surprised at the amount of information which students could gather in the latter part of the last century. In the present day we feel a just cause of complaint at the immense amount of learning that is demanded from our scholars when they are contending for their earlier degrees at the universities. But, in fact, there are few of them who have had so wide a mastery of many subjects as that which youthful scholars, like Thomas Young, possessed. The difference only is that the type of the school he belonged to sought the learning voluntarily, whilst our scholars have it forced upon them and grind for it, a mighty difference in the long run.

During the time that Young remained as tutor to Hudson Gurney in Mr. Barclay's residence in Hertfordshire, he spent a considerable amount of time during the winter season in the metropolis, where he rendered himself conversant especially with the Egyptian language, becoming very well acquainted with its rudiments, which he included later on in a dictionary on the subject. During the time he resided in London he also became intimate with Dr. Brocklesby, his uncle, and at Brocklesby's solicitation, or in imitation of him, he made his first entrance into the profession of medicine; he likewise made, during this time, the acquaintance of many men very prominent in the worlds of letters and science, by whom his general knowledge of the world at large was considerably increased, for Dr. Brocklesby seems to have been a man who gathered about him all kinds of distinguished friends and gained their best attachments.

Brocklesby, probably an Irishman, was born in the county of Somerset, in England, at a place named

Minehead, and in that way, I should think, formed a matrimonial connection which afterwards caused him to be related to Young, of whom, as his nephew, he was very proud at a very early date.

To Burke, Young seems to have been specially introduced with particular mention of the studies he had undertaken in the Greek tongue, and in 1790, we find him following the lectures of Dr. Higgins on Chemistry, under Brocklesby's directions; while Mr. Wyndham, a fellow friend both of Brocklesby and Burke, said of him, "that, whatever he determined on, he did." He had himself little faith in any particular aptitude implanted in him, by nature, for any given pursuit. His favourite maxim was that whatever one man had done another might do; that the original difference between human intellects was much less than it was generally supposed to be; that strenuous and persevering attention would accomplish almost anything; and, in the confidence of youth, and consciousness of his own powers, he considered that nothing that had been compassed by others was beyond his reach to achieve; nor was there anything which he thought worthy to be attempted which he was not resolved to master.

Dr. Brocklesby lived in Norfolk Street, Strand, and here it was possible that Young passed a considerable part of his time, especially when his career in medicine was fixed, and he had left, as was now the case, his country residence in Hertfordshire with the Barclay family. Brocklesby was bordering on seventy, and Young, still early in life, pursued, systematically, his medical studies. He took up the anatomical lectures of Baillie and Cruikshank with the demonstrations rendered by Wilson; he attended the surgery of

John Hunter; the practice of physic of Sir Alexander Crichton; the midwifery of Drs. Clarke and Osborne; the botany of Sir J. W. Smith—whose widow, at a very old age, recently died; the medicine, or practical physic, of Dr. John Latham, physican to the Middlesex Hospital, from 1789 to 1793.

In all his lectures Young seems to have taken most careful notes, and in his anatomical readings he followed the great work of Winslow; Pettigrew tells us that on the day upon which Hunter died, 1793, Young wrote the following passage:—

“Hei mihi! quantum Praesidium
Ausonia, et quantum tu perdis Iule!”

Having finished the usual course of study common to the London student in the latter part of last century, Young returned for a time to his native county, and, notwithstanding many solicitations from distinguished men in favour of other courses, he remained true to physic. The Duke of Richmond, who was then Master General of the Ordnance, wished him to take the post of his assistant secretary, a favour which the Duke probably asked through Dr. Brocklesby, or through Charles, Duke of Richmond, a doctor of medicine of Cambridge, and a Fellow of the Royal College of Physicians from 1729 to 1750. Other friends, including Mr. Burke and Mr. Wyndham, would have had him proceed to Cambridge and become a student of the Law, but to no purpose.

In 1793 Young forwarded to the Royal Society through Dr. Brocklesby, a paper entitled “Observations on Vision,” which seems to have attracted considerable attention; for, in the following year, he was raised to the Fellowship of the Royal Society, and afterwards

proceeded to Edinburgh, at that time the famous school of medicine of the land. He took there the courses of Black, Monro, and Gregory, then amongst the most celebrated teachers of the world, the life of one of whom, Black, has already appeared in these pages; and, when these courses were over, he set out for Göttingen, the home and university of which seems to have been to him a scene of continued delight and satisfaction. He graduated at Göttingen in 1795 as a doctor of medicine, electing for his competitive essay *De Corporis Humani Viribus Conservatricibus*: he also delivered a lecture on the formation of the human voice. A letter by Young addressed to his mother, from this place, gives us a good deal of the life which he had now passed. The letter, which bears date November 22nd, 1795, tells the mother how he settled in Göttingen, and how much he likes the university. He has not, he says, a great deal of society to amuse or to interrupt him, and there are only three English students as his colleagues, two of them diligent and attentive, the other a man of fortune, and more dissipated; they were well acquainted, but did not wish to be much together, and engaged themselves, under a penalty of a forfeiture, never to speak English to each other after the first month. He began his work at eight in the morning with lectures on history, then followed others of medicine, and natural history. He had two good rooms in the pleasantest part of the town, in a house which Professor Arnemann let out to students, a man and his wife living in the house to wait on them all. He breakfasted in his own room; dined at an ordinary, composed chiefly of students, at midday, and in the evening ate an egg alone. In another letter, on April 24th, in the following year, Young tells his mother

that he is within a hundred yards of the second library in Europe, and can have any book he wishes to consult. He desired to graduate at Göttingen, but not liking, rashly, to give up the privilege of a member of the Society of Friends, asked and obtained leave to be admitted without oath, a case which was then perfectly new. In July of the same year he reports the fact of his graduation; says there was no difficulty with respect to the oath, and that the whole time passed away very lightly, and with as much credit as he could possibly wish for. He would only remain a few days in the University, and would like to have a letter sent to him to arrive in about two months in Dresden.

He visited Dresden after his graduation, proceeded to Berlin, and, upon mastering the German language, came back to London for a time, and then visited Cambridge, where, as a fellow-commoner at Emmanuel College, he remained three years in pursuit of his studies. He graduated as a doctor of medicine of Cambridge, and, in the strict order in vogue at the period, was quite fitted to commence the practice of medicine as a physician, and to be elected first as a Licentiate, and, in due course, a Fellow, of the Royal College of Physicians, to which latter honour he was raised in 1808.

While he was at Cambridge Young became practically independent, for the famous Dr. Brocklesby died in London at a full age, and left to his nephew, not only his fortune, but also his library and a considerable amount of reputation. Young entered the metropolis with a good start, to use a common phrase, and, to some extent there is no doubt, endeavoured to obtain medical practice, for he took a house in Welbeck Street, which was then a common centre for medical men of

eminence, and which from the period of the Gordon Riots had been considered one of the best of the West End localities. He could not, however, have settled very seriously, for in the year that he came to London, 1802, he travelled with the Duke of Richmond and Lord George Lennox to France, and resided with them for a time at Rouen, after which he went, probably with them, to Paris, where he also, for a time, resided, and evidently mixed with the very best scholars of that country, and perhaps formed the friendship of M. Arago, although at that moment Arago, born as late as 1786, must have been a youth training for fame. It would appear that the life in Paris was to Young a very great pleasure; Paris was a seat of study, and, as may well be conceived, a centre in which he met and learned at the Institute many advanced and useful things, although it cannot be said that at the time mentioned France was in a state of peace or in great friendship with England, for the Battle of the Nile had been fought and Trafalgar was not far off. Napoleon also was becoming the first name in France, for he was elected Consul for life in 1802, and, although he made overtures to England, which many considered friendly in their nature, he was not particularly inspired by English politics. Whether Young returned to London from Paris during this time has been a question which certainly has its affirmative side, for he was elected about then Professor of Experimental Philosophy in the Royal Institution of Great Britain, and became established as a Lecturer there. Certain it is that he was back in London in 1804, as in that year the Royal Society conferred upon him the office of foreign secretary. In that same year he fell in love with Miss Eliza Maxwell, who, to his great satisfaction, became his wife.

A lecturer in the Royal Institution in the beginning of the century was not likely to have been a successful practitioner of medicine. It has never been the fact that any such man, however skilled in the art of physic, could become a popular physician. The world never likes a scientific doctor ; and Harvey himself, although he discovered, or rather made clear, the circulation of the blood and the motion of the heart and blood, was one of the last who would be consulted practically, either on the heart or the blood, since he was of little moment—nay, even a matter of doubt and wonder—to his less learned brethren. Young was no exception ; he was a man of knowledge and science, which was quite enough for his discomfiture in practice, if he ever felt it. Still, he endeavoured to practise, and at the same time delivered his discourses, as Sir Humphrey Davy did, and the other of his compeers. He continued to do so until a little time after his marriage, publishing finally, in two quarto volumes, the subject-matter on which he had extended his experimental gifts and his verbal illustrations.

I have conversed with those who have seen Dr. Young and who knew his qualities. Dr. Roget was one who had seen him, and who, at dinner at the late Sir Thomas Watson's—where at various times in my early life I met several of the older men—gave me charming descriptions of him. Dr. Tweedie recollected him ; so did Dr. Billing. Dr. Robert Willis held him in his remembrance. The late George Cruikshank, a layman and artist, had met Young, had once conversed with him by accident, and was surprised to hear that he had “sloped away” so quietly. Pettigrew, who was the friend of G. Cruikshank, wrote, as I have said before, the life of Young—and, indeed, wrote it so well that it

is impossible to refer to the memoir without finding an unmistakable picture. Dr. John Davy told me he kept him as closely in mind as he did his own brother, Humphrey. All joined in the same testimony. They stated that Young was a good-looking and good-natured man; that he was exceedingly accomplished, quite an addition to the social table, refined in manner, although, like all Quakers, a little reserved; that he was in his early days an active pedestrian and horseman, but seemed to imagine that every other person was as learned as himself, which often made his mode of expression obscure; that he cared very little about the world's opinion of him as a physician, had not an exalted idea of medicine generally, and, being placed in easy circumstances, never ran after practice, and never sought the bubble reputation at the cannon's mouth. Sometimes he smiled quite incredulously at "skill," as it was called, and quoted Ecclesiastes, without being pessimistic in his tendencies.

After his marriage with Miss Maxwell Dr. Young continued to live in Welbeck Street, giving up, in a short time, his position of lecturer to the Royal Institution, but publishing the lectures he had delivered there in the quarto volumes already named as "A Course of Lectures on Natural Philosophy and the Mechanical Arts," volumes admired by many, and followed by some, although never remarkably popular. They might, indeed, be studied even in this day with very considerable benefit. I do not agree that these volumes are either fanciful or abstruse; Young was far too solid a man ever to have possessed a fanciful nature. He was not a man who was in any way abstruse by intention; he saw for himself what was perfectly clear before him, and he wrote in that spirit, however

difficult it may have been to have followed him as a lecturer. In point of fact he was in advance of his time. His days were of the romping period heralding the Regency, and were very much influenced by the crude ideas and by the fashionable converse of the day, to say nothing of its acts. It was not very likely, therefore, that his solid discourse should enter deeply into the public mind. Moreover, in the Royal Institution itself, other subjects than his own had gained prominent position, the works of Davey having, as far as they could, carried all before them. Still, the volumes remain, and it might be the labour of some man who is not too busy to republish them with due comments, connecting them with the labours and thoughts that are now current discourse.

There can be no doubt that at this time Young continued to practise, occupied with some morning practice, and with a certain, though small, measure of physician's consultation, for in 1810 he was elected one of the physicians to St. George's Hospital. There he must have taught the younger minds, and carried on a rather extensive clinical labour for part of the year at least. It is not evident, however, that he made any great mark in St. George's, as John Hunter did before him, or Sir Benjamin Brodie later on. I made, many years ago, some enquiry on this matter, and do not find that he was ever a leading man in the hospital, which did not for many years after him possess an independent school. The late Mr. Samuel Lane, who founded the school entitled the "St. George's School of Medicine," and whom I knew, was not himself an official of St. George's Hospital, but continued to teach in the special school to which he belonged, and which became very useful to St. George's Hospital for many years.

Mr. Lane, who finally went to St. Mary's Hospital on its foundation, related to me that he very well remembered Dr. Young, but that he always regarded him rather as a philosopher than as a physician; he recognised him as a man of the highest talent and reputation. Thomas Pettigrew, whom I knew, and his son, Vesalius Pettigrew, once a colleague of mine, also remembered Young, and Vesalius, conversant with his own father's ideas respecting him, sounded the admiring tone whenever he spoke of him.

This is what I have been able to gather about Dr. Young's London life, but my friend, Dr. Haward, reminds me of the portrait of him by T. Brigstock, copied from Lawrence, that is now in St. George's Hospital, where Young remained a Physician until 1829.

It is interesting at the same time to know, that during the period in which he practised in London, Young became also a resident, at intervals, of the town of Worthing. It is probable that he did not find London air and life altogether suitable to him; for, although he seems to have been a moderately strong man in his youth, he did not retain his strength fully, but was affected occasionally with what was said to be an asthmatic tendency; thereupon, he divided his seasons between London and Worthing, spending the winter part in London and the summer part at the seaside.

At the time when Young began to take up his residence in Worthing, that town was beginning to take the first place amongst certain of the West End inhabitants of London. Worthing rose into fame soon after Brighton, which had become distinguished as a watering place through the labours of Dr. Russell. About 1804 Mr. James Evans, M.A., began to live at Worthing,

and published a book entitled "A Lecture on Worthing and the Adjacent Villages, with the Tides, and with the Excursions in the Vicinity." Very little public notice had been taken of this seaside resort in Sussex. Indeed, the village, as it might then be called, was in the parish of Broadwater near by, and the inhabitants of the place were mainly occupied with agriculture and such-like industries. Evans, who seems to have had a town house in Islington in what was called Pullin's Row, was the first writer who made any mention of the place. He was very particular in describing the journey from London. The course seems to have been through Southwark, Battersea, and Clapham, through Upper and Lower Tooting, and Merton—where once stood an old and famous abbey, and where there had just been a seat which Lord Nelson had occupied—Morden, Ewell, Epsom, Ashstead, Leatherhead, Mickleham, Dorking, Horsham, by Great Winstead, on to Findon, Broadwater, and, finally, Worthing. Of course, in this pilgrimage, coaches, at the period named, were the only methods of transit; yet the route was very entertaining, from the number of historical events that occurred on it. As Evans says, the road from London exhibited all along, on each side of it, ever-varying and irresistibly attractive beauties of Surrey and Sussex. In the summer season the journey of eight hours was pleasant and never fatiguing, presenting to the eye the charms of a well-cultivated country. The town of Worthing itself was not then very brilliant; the huts had been pulled down which the fishermen had held, decent houses began to be scattered about; and it is most probable that Young lived in one of these, and perhaps possessed it. A map at this moment lies before me showing how the town was then laid out. It consisted

of several streets, a theatre, and some rows of rather elegant dwellings. The accommodation seems also to have been very favourable; Warwick House, opposite the Colonnade Library, was considered as rather a conspicuous marine residence; and the town had the advantage of affording many houses of various sizes for the families of persons of good standing who resided in the metropolis during the greater part of the year. Schools also began to rise in this locality. Young was certainly there in the year 1813, and probably shared in some measure, in 1814, in a kind of demonstration, which took place owing to King Louis XVIII. having sent to the town, through the Archbishop Duke of Rheims, a letter returning his thanks for their congratulations on his ascent of the French throne; but it is not clear that Young made himself in any way conspicuous as a resident of the place, for conspicuousness was not his tendency. He was much absorbed in his natural history pursuits, and he cared very little for what was going on around him, though he was certainly favoured by the climate and the surroundings. He found a good beach, agreeable baths, and a fine vegetation, myrtle trees in abundance growing in the open air, and reaching sometimes to twenty feet in height, fig trees in luxuriance, a very fine sea, and pleasant walks. He also found an acceptable company, probably some members of the royal family, and a great many of the better class of the land. In short, he enjoyed this place as a resting-place, and sometimes used it as a centre in which his literary work could be systematically pursued.

I have endeavoured industriously at Worthing—and Mr. C. F. Williams—who resides near Worthing, has done his utmost in helping me—to find out where it

was that Young resided during the summer months, and how many years he remained there. These facts are all gone; but it appears that he returned to London about 1823, and resided in a house which he had built for himself in Park Square. This must have been in Regent's Park, a spot, at the time named, becoming famous, and where many distinguished persons were pleased to retire. The park itself was in process of ornamentation, with the promise of a Zoological Garden, a promise which very soon became fulfilled, under the guidance of Mr. Raffles, an active and useful naturalist.

Young resided in Park Square to the end of his life, following out his work in various directions, but specially in the Royal Society and the British Museum. He did not, however, confine himself entirely to England, for in the year 1817 we find him in Paris as a distinguished Englishman, the friend of Arago (now a recognised master in science), Cuvier, Humboldt, and others of that type. In England he became a commissioner under the Privy Seal, in conjunction with Dr. Wollaston, Dr. Charles Gilbert, Sir George Clark, and Sir Joseph Banks, in order to investigate the state of weights and measures throughout Great Britain. To this Commission he acted as secretary. He was also appointed by the Board of Admiralty to conduct the calculations for the Nautical Almanack, a task which he continued until the end of his days.

Such, in general outline, is the course which Dr. Young seems to have pursued. It is clear that he never attempted to be a fashionable physician, and, in fact, rather despised such a position than otherwise. His mind was turned towards natural science, and, although he cannot be said to have been devoted to his profession,

he certainly considered it a noble profession, was attracted to it, and gave to it, when it was before him, the fullest and happiest consideration. He gained few distinctions, except those which came from scientific distinction, in this country, but he became a member of the most distinguished circles of France; and, in many respects, he was the leader in scientific works afterwards carried out by other men, by rendering such work accessible to, and understandable by, the public at large. I cannot trace that he was ever appreciated by the members of royal or noble families, nor were the practitioners who were accustomed to attend those families solicitous as to his opinion in any medical case; and some think that he cared nothing for the neglect, and was rather glad not to have any tax upon his time, intellect, and investigation, that might lessen his success and future fame.

Let us now briefly consider the bases on which his fame rests; that is to say, the demonstrations and theories he proposed, and the books he left behind him for our education.

THE PAPERS AND WORKS OF YOUNG—THE MEDICAL.

The works of Dr. Young may be divided into two classes—those which are medical or physiological, and those which are philosophical. It need not be denied that the philosophical essays held the first place, and that in the medical he did not, from some cause or other—perhaps from want of time—compose or write so as to be distinguished as a practitioner as well as a philosopher. We will, however, take certain reviews of the medical works first, and then touch briefly on the philosophical.

CLIMATE.

The first subject to which attention is thus drawn in the works of Young is an essay on the medical facts of climate. This essay includes a large amount of information, and was written about the year 1813. There are many parts of the work which seem to have formed an introduction to a time of medical literature that might be usefully transcribed. I must be content to take only a few parts. He considers that a complete system of meteorology, so far as the properties of climates with regard to temperature may be concerned, would represent almost as great difficulties as the complete theories of the nature and cure of disease. The simple indications of a thermometer, however accurately they may be observed, by no means award a correct temperature as it affects the human system; nor is it possible to express the modifications produced by wind and moisture even supposing them to be easily known. He had known a temperature of 65°, with a thick fog and very little wind from the north-east, appear to a person taking moderate exercise most oppressively sultry; although a person sitting long still might have felt the same air uncomfortably cold. Moisture must make both hot and cold more sensible; the one by diminishing respiration, the other by increasing the conducting power of the air.

Of the empirical evidence which may be collected respecting the medical effects of different climates, the most authentic, he says, "is perhaps that which is derived from well-regulated bills of mortality; since these documents ought to afford us a tolerable criterion of the general healthiness or unhealthiness of a place, from the proportion between the annual deaths and the

population, and they ought also to afford a pretty correct determination of the degrees in which different diseases are fatal. Thus, when we find that in Stockholm the annual deaths amounted to $\frac{1}{19}$ of the population, in London to $\frac{1}{21}$, in the Pays de Vaud to $\frac{1}{45}$, and in some villages in different parts of Great Britain to $\frac{1}{60}$ only, we cannot hesitate to consider a residence in the country as generally more healthy than in a metropolis similar to either of those cities; although it cannot fairly be concluded that the healthiness is precisely in the proportion which might be inferred from this comparison, until we have considered how far the effect of emigration to a great town may influence the apparent mortality. After the age of eight or ten, the probable duration of life may be estimated with sufficient accuracy, as Demoivre has very ingeniously shown, by assuming that, of a certain number of persons born together, one will die annually until the whole number has become extinct; and it is well known that this number may in common cases be supposed to be eighty-six; so that at any given age, for instance thirty-six, we may find the probable duration of life by deducting it from eighty-six and halving the remainder, which will give us twenty-five for the estimate required. And if this law were universally true from the time of birth, it is easy to show that the mortality in a metropolis would always be increased by the accession of settlers; so that if, for example, the whole population were supplied by settlers at twenty, and all children were sent to a neighbouring village to be educated, the mortality of the town instead of $\frac{1}{43}$, would become $1 : (43 - 10) = \frac{1}{33}$, and that of the village would be $1 : (86 - 10) = \frac{1}{76}$; and that any partial changes of a similar nature would cause a smaller alteration of the

apparent salubrity, in proportion to their extent. But the mortality during infancy is actually much greater than is assumed in the simple hypothesis of Demoivre; and from this circumstance, as well as from the frequent return of aged persons into the country, Dr. Price has inferred that emigration in general has no tendency to increase the mortality of cities. In reality, the question depends altogether upon the mortality which may be supposed to take place within the first year, which is often estimated at one-third of the births; but nothing like this can well be expected to occur at any tolerably healthy place in the country; and, on the whole, it does not appear that Dr. Price's observations can by any means be admitted as conclusive. With respect to the evidence afforded by the prevalence of diseases, it has been observed by Dr. Gregory that removing from a colder to a warmer climate may be beneficial, even in those diseases to which the inhabitants of the warmer climate are subject; but if they appeared to be equally or more subject to any disease than the inhabitants of the colder, there would surely be little encouragement for the change; for instance, if a person were supposed to be liable to diseases of the liver, it would surely be injudicious to undertake a voyage to a hot climate, with a view of avoiding the chance of taking cold, since the well-known frequency of hepatitis, in such climates, would much more than counterbalance any prospect of advantage from the change."

MEDICAL LITERATURE AND NOSOLOGY.

In this same year, 1813, Dr. Young prepared a medical book entitled "Medical Literature and Practical Nosology," in which he wrote an introduc-

tion to medical literature, including a system of practical nosology. The work created a considerable sensation, and must, I think, have had a wider circulation than we now conceive. It certainly was a bold effort, and conveys, either intentionally or accidentally, that he had a large store of information both for hospital and private practice. In this work he fell a little across Cullen's System of Nosology, for which he almost necessarily received the severe criticism of the Edinburgh Schools, with the result of a sharp review from the Edinburgh Medical and Surgical Journal. It was considered, in this review, that he had been hasty in the manner in which he had set aside what was, at that time, considered the pure orthodox physic; and I have before me, at this moment, a letter of his in reply, not wanting in sharp retort. He corrects several errors; relates a conversation he held with the famous Dr. Willan on the subject of skin disease; touches on Sir Alexander Crichton, and defends the use he made of the term "*acology*" instead of *therapeutics*, *acology* meaning, by him, the separate consideration of the operation of particular remedies. The essay was probably written at Worthing, and bears date October 21st, 1813. To the same work Young attached essays on chemical affinity, the study of physic, classification, animal chemistry, notes on the work, on climates, and on the blood. The papers were altogether remarkable in many passages, as where he says that "there is no study more difficult than that of physic, since it exceeds as a science the comprehension of the human mind." In the work on the blood he described an instrument he had invented, which he called an *Eriometer*, for making exact measurements of the blood corpuscles, the

first, it would seem, of its kind, as Dr. Gower's is the last.

ESSAY ON CONSUMPTION.

Dr. Young was famous for an essay on consumption, which became of interest. At the period the stethoscope had not been discovered, although it was discovered before he died, and, therefore, it is necessary to take, *cum grano*, certain of the conclusions to which he was led. At the same time he deserves a certain very distinct measure of credit, as well as occasional admission of errors. Thus he supposed that the frequency of consumption was decidedly greater in cold than in hot climates, but not in exact proportion to the depression of mean temperatures. The whole subject is very curious. He was of opinion that in the West Indies both scrofula and consumption were uncommon, but that the inhabitants of the West Indies coming into a colder climate were peculiarly liable to attacks of these diseases; he urged that Bermuda and the more sheltered parts of Jamaica might be extremely favourable to the inhabitants of this country who were subjected to consumptive affections.

ON VISION AND THE MECHANISM OF THE EYE.

Through all the life of this author we find that he was a close student of vision and of the eye, his lectures and papers on these subjects partaking of a mixture of physiology, practice, and philosophy. An early paper bears on the topics named, and in one of his earliest Lectures, delivered in the first year of the century, as a Bakerian Lecture, he enters largely into the dimensions and refractive qualities of the eye, and the size of the pictures which are developed on

the retina. He considered that the lens was specially adapted to the character of the image that should be placed on the retina, and discussed, what had previously been considered by John Hunter, the capacity of the lens for movement, so that the distance of objects was, as it were, regulated by a muscular movement of the lens, which was under the control of the mind. He supported this view by the statement that persons operated upon for cataract, in whom though the lens was absent, the focal distance is always the same.

PHILOSOPHICAL WORKS.

The observations and speculations of Young, which were of a philosophical order, are so numerous that I must not venture to treat of them at any length. We must admit that in these observations are embodied the noblest and purest part of his labours. There can be no doubt that he was really one of the greatest observers on these subjects, and when we take up the theory of light together with his idea of the wave motion of light and of the luminiferous sea, if I may so call it, which extends through all the universe binding one sun with another, suns with planets, and planets with their satellites, we have a lesson before us such as no one conceived so clearly as himself, or described so splendidly. Let the following short passage from his own words express something of what he conceived:—

“It was in May 1801 that I discovered, by reflecting on the beautiful experiments of Newton, a law which appears to me to account for a greater variety of interesting phenomena than any other optical principle that has yet been made known. I shall endeavour to explain this law by a comparison.

“Suppose an equal number of waves of water to move

upon the surface of a stagnant lake, with a certain constant velocity, and to enter a narrow channel leading out of the lake. Suppose then another similar cause to have excited another equal series of waves, which arrive at the same channel, with the same velocity, and at the same time with the first. Neither series of waves will destroy the other, but their effects will be combined; if they enter the channel in such a manner that the elevations of one series coincide with those of the other, they must together produce a series of greater joint elevations; but if the elevations of one series are so situated as to correspond to the depressions of the other, they must exactly fill up those depressions, and the surface of the water must remain smooth; at least, I can discover no alternative, either from theory or from experiment."

"Now, I maintain that similar effects take place whenever two portions of light are thus mixed; and this I call the general law of the interference of light. I have shown that this law agrees, most accurately, with the measures recorded in Newton's '*Optics*,' relative to the colours of transparent substances, observed under circumstances which had never before been subjected to calculation, and with a great diversity of other experiments never before explained. This, I assert, is a most powerful argument in favour of the theory which I had before revived: there was nothing that could have led to it in any author with whom I am acquainted, except some imperfect hints in those inexhaustible but neglected mines of nascent inventions, the works of the great Dr. Robert Hooke, which had never occurred to me at the time that I discovered the law; and except the Newtonian explanation of the combinations of tides in the port of Batsha."

I must not wait to observe on the various criticisms which have been made on this theory of Young in regard to interference of light. The chief point of it was that radiant light consists of undulations of the luminiferous ether, and as Mr. Pettigrew tells us M. Arago regarded this as Young's greatest discovery.

READING OF EGYPTIAN HIEROGLYPHICS.

Whether this reading was the greatest discovery of Young or not, reference must necessarily be made to the part he took in the matter of Egyptian Hieroglyphics. By most persons he is considered to have been the first man who discovered the way to read the hieroglyphics on the Rosetta stone, still kept in the British Museum.

The fate of this stone is very curious. It was first obtained by the French during their occupation of Egypt, Napoleon himself taking the greatest interest in the work. While some French troops occupied Rosetta, a few workmen, digging for the formation of Fort St. Julian, disinterred a huge pillar of black basalt on which was exhibited the remains of three distinct inscriptions. This monument then fell into Dutch hands, and was at last with other trophies brought to England. It caused here the greatest interest, and the last lines of the inscription told in Greek that the whole had been inscribed in three different characters, the sacred or hieroglyphic, the enchorial or letters of the country, and the Greek, all in honour of Ptolemy Epiphanes. Thus there was found a hieroglyphic with an express translation. In 1814, Young commenced his researches on the stone and deciphered the enigma.

It is supposed that Young's reading gave the key

to the lost literature of Egypt, but it has been assumed also that Champollion, of Grenoble, a contemporary, thirteen years younger than he, has the right to be considered the equal, and in some sense, the earlier philosopher. Apart from controversy there cannot be a doubt that the learning of Young, more than anything else, led to the various discoveries in Egyptian literature which have since followed.

The many other works to which the name of Dr. Young has been attached, are quite remarkable, and the reader who is interested in them must turn to the late Mr. Pettigrew's excellent memoir, where he will find them all very carefully laid out. He should also study the same author's work on "Mummies" to learn specially the Egyptian part of the great Englishman's labours. The medical reader, too, will find considerable interest in Young's essays on the "Cohesion of Fluids, on Shapes, Affected by Friction"; on the "Function of the Heart and Arteries"—a Croonian Lecture in which it is advanced that the larger arteries do not propel the blood, but act as passive tubes through which the blood passes by the motion of the heart—and many others.

CONCLUSION.

We have followed our illustrious brother now from the beginning to the close of his career. He was not an old man when he died, for he had only entered his fifty-sixth year when his life began to fail. In ordinary life he may be considered a fairly successful man, blessed with every means necessary for his support; childless, but the companion of an accomplished wife, and surrounded by distinguished friends, foreign as well as English. His connection with the Government was

most satisfactory until his later days. He was conductor of the "Nautical Almanack" and, as a member of the Board of Longitude, he was connected with Professor Faraday, and with Captain, afterwards Sir, Edward Sabine, who became President of the Royal Society. He was, in 1827, elected one of the eight foreign members of the then Royal Institute of France.

Young seems to have been in fair health until 1828, when his powers began to decrease, with breathlessness, whenever he made ascents. He was subject this year to some little mental annoyance, which was not, however, sufficient to account for the symptoms. Slowly he became more affected, and was under the care of Dr. Chambers, whom some of us remember, and of Dr. Nevinson. Although much annoyed by certain attacks that had been made upon him from the outside world, he was exceedingly composed, accepted the danger of his situation, continued his work, and at the church which he attended took the sacrament. He was of opinion that he had exerted his faculties through life as far as they were capable of exertion; but that for eight years previously he had been more careful of training them without injury, and he settled up all his affairs, so that if he recovered somewhat, he could pay more attention to scientific work. Unfortunately his illness continued steadily, and he felt himself gradually sinking, till the month of May, on the 10th day of which month he expired without a struggle, after just completing his fifty-sixth year. "The disease," says an informant, whose name is not given—probably Dr. Chambers—"consisted of ossification of the aorta," which must, he thought, have been in progress for many years, although constitutional formation and unwearied labour of the mind from the earliest days of

infancy, led probably, to the development of premature age.

Young was buried in the vault of his wife's family in the church of Farnborough, in Kent, where there is a monument to him. There is also a medallion to him in Westminster Abbey. The portrait by Sir Thomas Lawrence on the first page of this number was faithfully copied for Pettigrew, was published by him, and gives, I am assured, a faithful picture.



FOUNTAINS OF MEDICAL SCIENCE AND ART.

FORSYTH ON CAUSES OF ERROR IN SCIENCE.

[The essays on the principles of moral science, by Robert Forsyth, Esq., dedicated to the Earl of Moira, and published by Bell and Bradfute, of Edinburgh, and Longman, Hurst, Rees, and Orme, of London, in the year 1805, were, I learned from the late Dr. Robert Willis, a source of considerable trouble to the public mind, so that the first volume was the last, because suppressed, or withdrawn from publication. Why there should have been, even in 1805, such a narrow view extant, is a remarkable circumstance, for, in our days, the essays, usually beautiful in tone and intention, would be looked upon as of orthodox quality. I have always been greatly instructed and interested by these essays, and I think my readers will join in my admiration when they have read what follows on the causes of error in science.]

“ HEN we perceive the existence of any object, or that it resembles or differs from another object, this act is treasured up in the memory, and thereafter we express the recollection of such previous perceptions by the word *belief*. We say that we believe in the existence of a particular object, or that it possesses certain qualities. Hence, if the human understanding be an instrument correctly formed for the discernment of truth, and if memory be a correct record of its judgments, it would seem that no erroneous belief or opinion ought to find its way into the human mind. This, however, is very far from being the state of the fact; and it may be

proper here, very shortly, to take notice of some of the chief modes in which speculative errors obtain existence.

“*Firstly*.—The very limited nature of the human constitution exposes the understanding to great hazard of forming erroneous decisions. It is seldom that the objects which are to be compared can be perceived by the senses at the same period of time. If they are placed in distant situations, and cannot be brought together, or if a past is to be compared with a present event, as the weather of the last with that of the present season, the intervention of memory becomes absolutely necessary; and one of the objects, at least, can only be perceived as existing in that record. Hence, if the object or event was originally attended to in a negligent manner, or not sufficiently reflected upon, the traces of it may have faded, and the comparison will be imperfectly made.

“*Secondly*.—From the difficulty of retaining in the memory the whole individual objects that we observe in Nature, we are induced to arrange them or their qualities into classes; but from the limited nature of our observation, there is always a hazard that these classes may be imperfect, and that what we consider as general qualities may be nothing more than the properties of a few individuals. Thus a man who had never seen any metals excepting iron, copper, and lead, might readily be induced to say, and to believe, that all metals are liable to rust, or to become tarnished by exposure to the air, although this is not true with regard to another metal, gold, which he is supposed not to have seen.

“*Thirdly*.—Of a similar nature is the presumption whereby men endeavour, by conjecture, to explain all

science. Thus we are placed on the surface of a globe of twenty-five thousand miles in circumference, into which we have dug some pits a few hundred feet in depth. Upon the strength of these researches, abundance of ingenious persons have undertaken to explain the whole history and structure of the globe ; how and when it was fashioned ; what revolutions it has undergone ; and all the changes it will hereafter experience. These speculations are called theories of the earth ; and similar theories have, in every branch of science, retarded the progress of discovery, by withdrawing men from the drudgery of observing facts, and filling their minds with unreal but amusing imaginations.

“*Fourthly.*—The passions of men are, on all occasions, a powerful source of error in judgment. Their nature will be afterwards explained ; but in the meantime it may be here remarked that, by fixing their objects very powerfully in the memory, and thereby diminishing our self-command, they prevent the understanding from steadily considering their nature. Thus the objects of fear become exaggerated ; and from reflecting much upon the objects of hope, we are led to forget the difficulties which stand in the way of their attainment, and greatly to undervalue these difficulties.

“*Fifthly.*—But no source of error is equal to that which results from the influence of society. It has been remarked that even the organ of language, by which men hold communication, exposes them to error and mutual misinterpretation. Such, however, is the limited endurance of human life, and the narrow extent of the observation of individuals, that it becomes absolutely necessary to the acquisition of knowledge, that we give credit to the testimony of others. An

European, who never left his own country, has no other means of becoming acquainted with the existence of the rattlesnake, the shark, and the rhinoceros, than through the medium of the observation and report of others. In like manner, our acquaintance with past ages must necessarily come through the same channel. Thus, in becoming acquainted with facts, the errors of those to whom we trust are apt to become our errors.

“This is not all. In consequence of the absolute necessity of confiding at times in human testimony, we gradually acquire the habit of believing that to be true which we are told is so. Our parents and friends endeavour to impress upon our minds many notions which they regard as important truths. We are accustomed to take their word for most things ; and we very readily take, upon the same authority, the religious and moral maxims which they inculcate. Thus, by the time he is grown up in life every man believes a variety of opinions, adopted without discussion, or without any act of discernment of his own, which he has no better reason for believing than merely that he has been told they are true, and that every person around him believes as he does.

“It is to be observed, however, that this sort of belief is an operation of the mind very different from that already described, or from the exercise of the understanding in discerning truth, and in recollecting such acts of discernment. The kind of belief now under consideration amounts to nothing more than the formation of a lively idea of what we are told, without any examination of its nature.

“One of the most remarkable ways in which society influences the belief or opinions of individuals appears

in the effect of custom, or of what is called *fashion* (a principle to be afterwards noticed), in consequence of which men gradually learn to regard the greatest absurdities with respect. By means of it, the admiration which power, riches, and talents produce is communicated, in some measure, to the conduct of their possessors, and prevents our judging accurately of their actions. We are likewise apt to be led by what we see passing around us into a general error with regard to the nature of moral knowledge. Instead of considering it as an acquaintance with what men ought to be, we are apt to regard the human character as stationary, and as exhibiting, in our own age and country, all the worth which it was ever formed to attain. We consider the arrangements of society, and the mode of education which prevails in it, in the same light in which we do the course of the seasons, and the revolutions of the heavenly bodies, as unchangeably fixed by Nature, and we respect them as a part of her laws. In this light a Hindoo or a Chinese considers the ancient arrangements of the society to which he belongs.

“The chief source, however, of the errors produced by society result from the partialities which men acquire amidst their intercourse with each other. In political contests, for example, a man frequently finds himself engaged by his interest, his vanity, or his affections to *wish* to find his party or his associates always in the right; hence he is apt to *try* to convince himself of the propriety of their measures, to associate them in his memory with interests and notions to which he is firmly attached, and to endeavour to think them all very right. He usually succeeds in ultimately deceiving himself, or producing in his own understanding a total

inattention to the impropriety of the conduct adopted by his friends. He even sometimes proceeds the length of committing pious frauds in their favour—that is, he exaggerates their good actions and calumniates their antagonists. This mode of imposing upon the understanding is practised very frequently upon religious subjects. All religious sects have represented the belief of their tenets as highly meritorious, and even as absolutely necessary to obtain the favour of the divinity; hence weak persons, under the influence of the fear of punishment or the fervent hope of future felicity, are apt to try with all their might to believe the notions inculcated by their teachers, that by so doing they may avoid the endless misery with which they are threatened or obtain the happiness that is held out to them. This effort to believe consists only, as already mentioned, of an exertion of imagination to form a lively idea of the opinions inculcated, and of an effort to avoid admitting into the thoughts any notion contradictory to these opinions. Were it anything else, it would be unnecessary to urge the necessity of belief, or to enforce it by appealing to the hopes and fears of men. When we are convinced of the truth of any fact or principle, we cannot avoid believing it; it is only when we have received a notion without evidence, reflection, or examination, that we are in danger of falling into scepticism.

“*Sixthly*.—Moral science, however, is exposed to difficulties peculiar to itself, which deserve more particular attention, because they almost necessarily produce misapprehension and error. The operations of the human mind, the modes in which it is improved, and the degrees of improvement which it is capable of attaining, can only be known from time and much observation.

An individual cannot acquire such knowledge merely by reflecting upon what occurs within himself, because the situations in which one individual is placed are always limited in point of variety. But, as the human mind is trained up and fashioned by the exertions it makes, the difficulties it encounters, the passions it feels, and the means of observation which it enjoys, the variety of accomplishments which it is capable of acquiring, and the best means of improving it, can never be known from the example of a single character, as it is always possible that under a different education the same mind might have attained to higher degrees of intelligence. It is only by extensive observation, therefore, of the various aspects assumed by the human mind under every variety of circumstances, arising from soil, climate, laws, and public or social arrangements, that its nature and capacities can be fully known. But the opportunity of making such observation does not depend upon the skill of any individual, because we cannot place others in the various situations necessary to illustrate the intellectual progress which they are capable of making. This is a work which must be left to be accomplished by Providence during a succession of ages. Even after every requisite has occurred, and human society has existed during some thousands of years in a great variety of forms, still it is very possible that much of its history may have been misunderstood. Mind is always invisible, and the circumstances which ostensibly influence the conduct and the destiny of individuals and of nations are often produced by causes which elude investigation.

“The effect of error of every sort, in whatever manner it has been adopted, is to disqualify the mind, in a certain degree, for the pursuit of truth; it suggests the

idea that such a pursuit is unnecessary, as the object in view has already been gained; by the possession which it has obtained of the memory, it also deprives the mind of a portion of its voluntary power. Thus error, when once received, has a tendency to perpetuate its own existence, and operates as a weight to fix our nature in the dust and to prevent its progress in intellectual improvement. Errors thus received and fixed in the memory are denominated 'prejudices.' To avoid or surmount such prejudices, or to acquire what is called a candid mind, is a moral duty of no small importance.

"This world has hitherto exhibited such a scene of perplexity and confusion that there is no end of the notions and fancies that have been entertained by mankind. The inhabitants of one side of the globe are not more opposite to those on the other in situation, than in their ideas of what is true and rational. In Europe, as our minds are more active, so our opinions and manners are more mingled and incongruous than elsewhere; they partake of the ideas and practices of our ancestors in the whole variety of their history, and are such a strange mixture of Judaism, Popery, Protestantism, feudalism, chivalry, freedom, slavery, fanaticism, moderation, prejudice, scepticism, wisdom, and folly that, after a man has received a complete education—that is to say, after his memory has been filled with the whole of our notions, and his mind becomes habituated to the manners which are the result of them—he will find himself in a very perplexing situation if he attempts seriously and in earnest to discover truth upon almost any particular subject. He will find his memory already occupied by a system of opinions which may be true or false; the difficulty of preventing

these from embarrassing the judgment can only be conceived by those who have made the trial. There is such a mixture of truth and error in our notions that it becomes equally irrational altogether to disregard or altogether to acquiesce in them, while at the same time we know not how to separate the true from the false. This has given rise to very opposite trains of thought. Some individuals, having discovered a portion of the errors into which mankind have fallen, upon religious and political subjects rashly concluded from thence that they could not depart too far from vulgar notions and prejudices ; and thus, from supposing that all truth must consist of novelties, they have rendered their own efforts of little value, by the extravagant fancies in which they have been ultimately led to indulge. Others, on the contrary, from a firm attachment to the opinions which found earliest access to their minds, perceiving that they contain much truth, and that great absurdities have been adopted by those who ventured to disregard them, endeavour, as it were, to shut their ears, or to refuse their attention, to any challenge that can be brought against received opinions ; if they enter upon the subject, it is only to attempt to discover arguments whereby to fortify themselves and others in the notions they have received. It was from such feelings that the infallibility of the Pope, and the divine, indefeasible, hereditary right of kings found zealous and faithful supporters in a former age. To judge fairly of opinions it seems necessary to acquire a kind of spirit or character, which is usually more successful in discerning what is true than in making proselytes to truth after it is discovered—that is to say, it is necessary to acquire that degree of self-command which prevents

the mind from being strongly impressed with preconceived opinions, from whatever source they may have come, and renders it neither liable to be powerfully attracted by the love of novelty nor by ardour for applause, all of which sentiments tend to interest their possessors too deeply in the systems they adopt. It unfortunately happens, however, that this philosophical tranquillity or candour of spirit is usually produced, not by wisdom, but by indolence. Our passions are the chief causes of our exertions, and hence men of active minds, by whom discoveries of all sorts are most likely to be made, are usually at the same time possessed of a restless and vehement character, which leads them to every extreme in action and in thought, and to disgrace, by extravagant novelties or by imprudent conduct, their successful speculative efforts.

“In this point of view there seems to be something defective in every mode of education which has yet been devised. From the practice of filling the memory of young persons with opinions which they are as yet unprepared to investigate, and which they cannot afterwards easily relinquish, it unfortunately happens that persons of regular characters and sober manners are seldom the best qualified for the discovery or discernment of new truths; and that men of defective education and irregular lives often make the greatest discoveries in the sciences and arts, and possess comparatively more acute discernment than persons of better intentions and character. The celebrated Paracelsus, whose notions made so great an impression in the medical world, is a noted instance of acuteness of mind as separated from private respectability; and the misfortunes and vices of some distinguished English poets and men of letters, seem to establish the principle

that the minds which too easily receive education, or the habits approved by mankind, are apt, by the same passiveness of temper, to remain satisfied with whatever notions have been early impressed upon their memory, and avoid making valuable speculative efforts ; whereas the more turbulent and restless spirits, by the very errors into which they plunge, escape imbibing unexamined opinions ; and thus remain better qualified for the exercise of the understanding. Perhaps the more laborious religious education which the Roman Catholics receive is the chief cause of their inferiority of invention to those educated in Protestant countries. That education would be the best which should inculcate the fewest unintelligible and unexamined opinions ; while, at the same time, it should excite the mind to speculative curiosity, and produce habits of regularity and temperance in private life.

“ It is impossible to give rules in detail for discerning truth in every branch of science. The general moral principle, however, upon which we ought to proceed is this : that the capacity of discerning truth forms a large portion of the excellence of an intelligent nature ; that it is of no importance to us whether the notions of our countrymen are true or false ; but that it is of much importance that we should find out truth as it is, and act, or at least judge, according to it. The usual cause of error is not that we are unable, or want discernment, to discover the truth ; but that we have become attached to a train of opinions which we are unwilling, or fear, to dismiss. In such cases, it will almost uniformly be found that our opinions had been adopted, without examination, upon the authority of others. This infallibility gives rise to angry and uncandid disputation. A man who has long acted upon a favourite notion,

finds his self-estimation alarmed when he discovers his own inability to justify it ; whereas, had he begun by examining accurately its truth, the same reasons which originally justified his belief would probably do so still. At all events, as it was only on account of these reasons that he had suffered himself to be swayed, a discovery of their defectiveness would readily lead to a change of sentiment.

“It is not an uncommon practice, both among political and religious sectaries, to avoid reading any book, or even listening to any conversation favourable to the wrong side of the question ; that is to say, the side that opposes their own party. When books are read, it is for the purpose of what is called being improved by them, or to treasure up in the memory the sentiments contained in them, and to acquire the habit of thinking as the author thinks. This, when done under the notion that it improves the human mind, is abundantly absurd. It is acting as if we came into the world, not to improve our faculties by the discernment of truth, but to become sectaries of one kind or other. It ought to be remembered that no man can become wise merely by the wisdom of another. He who believes a principle only because he is told that it is true, cannot justly be said to know it, or to have become any wiser. If a man is told that the whole of a thing is always greater than any of its parts, he has no doubt been informed of what is very true ; but if he implicitly believe this assertion as a matter of fact, and do not, by an act of his own understanding, perceive its reality, and how and why every possible objection to it must necessarily be false—he is not advanced one step towards the perfection of an intelligent being. That perfection consists in every individual, not in having the memory

stored with propositions, but in the capacity of discerning truth by the proper energy of his own mind.

“It is indeed said, that weak minds may be misled by the indiscriminate perusal of whatever has been thought or written by ingenious men : but all minds are originally formed weak—that is, ignorant—and the object of their creation is, that they may one day become vigorous, which can never be accomplished without the full exercise of their faculties. Providence trains up the minds of men to penetration and vigour, not by placing them amidst enlightened beings, who might at once introduce them to much knowledge, but amidst their equals, that is to say, among erring beings, whose various opinions afford full employment to our faculties to discover truth amidst the obscurity in which they usually involve it. If we would improve successfully our intellectual powers, we must do for ourselves what Nature has already, in some degree, done for us. For the sake of going right we must encounter the hazard of going wrong. We ought to attend to what others have thought as an intellectual exercise which Nature has provided for us, but at the same time to receive what is said in books, or by men, not as truths, but as thoughts concerning truth, which we are not to believe but to weigh and consider. Even if our own conclusions should often prove false we shall still gain much ; we shall, at least, acquire application, acuteness, and energy of mind, qualities which bring us near to the description of excellent beings ; which will in the long run enable us to rectify every error, and carry us forward in that improving career which our nature is formed to run.

“With regard to a large division of moral science, it ought to be remembered, that any truth which we can

discover is not absolute, but relative. We may discern, with absolute certainty, what ought to be the ultimate object of human pursuit; because the whole arrangements of Nature point out the improvement of our intellectual character as the purpose of our existence; but the means of improving that character must necessarily alter according to circumstances. Thus the kind of education which was the best that could be attained in ancient times, when books were few, and of difficult access, and when it was necessary to resort to public theatres to obtain an acquaintance with the laws, religion, and even the history of our country, would now be justly regarded as extremely defective, when the art of printing has lodged with every individual more extensive means of information. From his progressive nature man is continually altering. No system of institutions or arrangements, therefore, can be formed which will remain at all times well adapted to his condition. In a scene which, by the successive improvement of every art, Nature intends to exist in a state of continual fluctuation, the chief source of error is that presumption by which, on the one hand, men imagine they have devised arrangements, which in all probable circumstances will remain for ever, and unalterably, suitable to the condition of human society; or by which, on the other hand, they attempt to foresee, and too hastily to aid the changes which Nature is gradually accomplishing in the world, before she has fully developed her own plan of operation. It is from this last circumstance that philosophers often fall into errors which to ordinary minds seem to demonstrate wonderful weakness. Thus our ablest men repeatedly issued erroneous predictions about the highest amount to which what is called the funding system, or British

national debt, was capable of being carried. This grand political experiment is proceeding, like all other events, under the management of Providence, for the instruction of future times: individuals, however, for some time after its commencement, without waiting the result, only exhibited instances of human rashness, by attempting to say where it was to terminate. When the experiment shall either have been completed, or shall have drawn very near to a close, it will then only become a sure source of instruction, which will render it no difficult matter for men of sense to foretell the result of such experiments in after times. In whatever relates, therefore, to the condition of man in this world, there is no other means of attaining to the knowledge of absolute truth, than that of observing the variety of forms which the human mind is capable of assuming in every possible situation. The world has existed long enough to afford much information in this respect. If we still exist at too early a period of its history to be able to complete the investigation of the human character, that circumstance, while it demonstrates that the field of moral science can never be fully occupied, ought at the same time to operate as a lesson of moderation, or a warning against the presumption of those who either imagine that, by running before Nature, they can state a complete system of truth upon this subject, or who would treat with severity any attempt to advance notions which the present generation may regard as bearing the aspect of novelty."

ORIGINAL RESEARCH, EXPERIMENTAL AND INDUCTIVE.

(Continued from p. 327.)

"Dire n'est rien ; faire est tout."—RENAN.

PHYSICAL RESEARCH ON NERVOUS MATTER.

PART IV.

ELECTRICAL MEASUREMENTS.

IN my last paper I finished by recording that in Obs. XLIV. water added to brain pulp affects conduction, with the distinction that a layer of the brain substance is deposited on the platinum surface that forms the terminal of the anode. The observation has led me to think that what was observed was due to electrolysis of the water in the tissue. In order to come to a better conclusion on this matter, I went out of my way a little to try the effect of the current on blood in various states, with the probable result that this opinion was the correct one. It is time, however, leaving that point for a future moment, to return to experiments on nervous substance with a remembrance of the idea.

In the continuance of the observations on nervous material, I used glass tubes one inch in diameter, and corked at each end, the space between the corks being a precise inch. Through the corks two small glass tubes were passed, each end giving out a platinum

wire point projecting slightly, and annealed all around by the glass. These platinum points formed the two poles, and could be pushed up and down so as to meet each other, or stand at a distance apart. In the large tube was placed the substance that had to be tested, so as to render it the conducting medium from one pole to another. The plan seemed simple, but some inconvenience was found in moving the small tubes up and down.

Mr. Bertram Richardson therefore invented for me another and better plan. It consisted in taking a glass jar, closed at the top with a good cork. Attached to the cork, and extending over the rim of the jar, was a round disc of wood marked as a dial. The disc and cork were drilled at two places for the admission of two glass tubes. One of the tubes ran downwards, and terminated about half an inch from the bottom. Through this tube a platinum wire was passed, the glass being annealed at the lower end, but allowing a small point of the platinum to protrude as a fixed terminal. The other glass tube, also annealed round a platinum wire, was fixed in a brass socket in the cork, and to it a hand was placed by which it could be turned, the hand registering its movements. This tube passed down the jar, and at half an inch from the bottom was bent for an inch at a right angle precisely corresponding with the hand at the top; this glass tube, also annealed, with a small point of platinum protruding, formed a movable terminal, which could be brought farther off or nearer to the fixed terminal by simply rotating the hand over the disc above.

When all was complete, the fluid to be tested was placed in the jar, and the terminals were brought an inch apart. The other and free lengths of the platinum

wires were carried in the tubes through the cork at the top of the jar, and were connected, one with the battery the other with a galvanometer in union with the battery. The circuit was completed by the medium of the substance to be tested, and it was so easy in this apparatus to prove the conducting or non-conducting power of various substances, that it became possible to apply it in any number of substances. It seems to me, indeed, under further experiment, to be an apparatus useful beyond what I expected of it, as will be indicated in the results on nervous matter recorded in the observations that follow.

In the employment of this measuring instrument, a battery of chloride of silver, in twenty-four small cells, was the source of action, and the conducting platinum wires were of one gauge and length, those of the galvanometer throughout being the same. All the conditions were, consequently, identical, and any variations of results came from differences in the foreign body that had to be tested.

OBS. XLV. *Water*.—Into the jar distilled water was placed, and the two platinum terminals were made to stand in the water one inch apart. The battery of twenty-four cells was carefully connected, so as to have an inch of water intervening as a part of the circuit. The galvanometer showed five degrees of divergence.

OBS. XLVI. *Brain Pulp*.—The glass jar was charged with brain pulp instead of water, and the terminals were introduced so as to let the pulp occupy an inch of circuit. On making connection with the battery the galvanometer registered a movement of precisely fifteen degrees.

OBS. XLVII. *Brain Pulp and Water*.—Brain pulp

was mixed with equal parts of distilled water and placed in the jar, with the platinum terminals one inch apart. The intervening substance conducted so well that the galvanometer registered a variation of twenty-five degrees.

OBS. XLVIII. *Brain Pulp and Oxygen*.—Five hundred grains of brain pulp were placed in the jar, to which were added twenty grains of neutralised peroxide of hydrogen of ten vols. strength. The brain pulp and the oxygen solution were intimately mixed. On connecting with the battery the needle diverged eleven degrees and then gradually receded to two degrees.

OBS. XLIX. *Brain Pulp, Water, and Oxygen*.—Five hundred grains of brain pulp with water in the same quantity were placed in the jar, and to them were added, and intimately mixed, sixty grains of ten vols. solution of neutralised peroxide of hydrogen. On making the connection with the battery the needle diverged twenty-five degrees.

OBS. L. *Brain Pulp, Phosphorus, and Oxygen*.—Five hundred grains of brain pulp were put in the jar, and there were added twenty grains of neutralised peroxide of hydrogen. To this mixture were then put thirty grains of five per cent. solution of phosphorus in carbon bisulphide, so that the residue, the bisulphide being evolved, consisted of brain pulp, peroxide of hydrogen, and phosphorus. The result was that, on completing the circuit, the needle first diverged twenty degrees, fell back to thirteen, and, on addition of sixty grains more of the peroxide solution, rose to twenty-five degrees, owing, it is possible, to increased oxidation in the presence of phosphorus.

Seeing that the presence of an oxidisable substance increased the action of the needle, I thought it worth

while to ascertain whether the presence of other substances might not modify the oxidation, and by this means interfere with the character of the current. I accepted absolute alcohol as being the substance most likely to change the divergence.

OBS. LI. *Absolute Alcohol*.—The current was tested with absolute alcohol, the terminals immersed being precisely one inch apart, and absolute alcohol forming the divided part of the current. On making connection with the battery the needle remained unmoved.

OBS. LII. *Water and Alcohol*.—Water and alcohol were mixed in equal parts, and the terminals inserted as before. The needle diverged one degree.

OBS. LIII. *Water and Alcohol*.—Water and alcohol were so mixed that the water contained twenty-five per cent. of alcohol. The terminals were placed in the solution with the platins one inch apart. The needle diverged precisely two degrees.

OBS. LIV. *Water and Alcohol*.—Water was charged with ten per cent. of absolute alcohol, and the terminals were introduced so as to leave them the same distance apart. On making connection with the battery the needle diverged three and a half degrees.

OBS. LV. *Water and Alcohol*.—Water was charged with five per cent. of absolute alcohol, and the terminals were placed, as before, one inch apart. On connection with the battery the needle diverged four and a half degrees.

It is obvious from the above experiments that alcohol has the power of repressing or resisting the electric current, and that it exerts its action even on admixture with water. It was important, therefore, to try if the same effect would be produced when the alcohol was admixed with brain pulp.

OBS. LVI. *Water, Alcohol, and Brain Pulp*.—A solution was made containing twenty-five per cent. of alcohol in seventy-five of water. Five hundred grains of fresh brain pulp were treated with five hundred grains of this solution, and the mixture was tested precisely in the usual way, when it was found that the galvanometer stood five degrees lower than it otherwise would have stood if no alcohol had been present. It is unnecessary to repeat, in detail, the record of experiments having the same bearings; but it is sufficient to say, as a general fact, that it is the property of alcohol, whether it be admixed with water or with brain pulp, to act as a check to the electric current, and, if added in sufficiently large quantities, to stop it altogether.

The experiments made with alcohol led me next to try other agents, commencing with chloroform.

OBS. LVII. *Chloroform*.—Into the jar already described sufficient pure chloroform was poured to cover both the platinum points when an inch apart. The connections were made in the usual way, and the points were put in the same position as when alcohol was under the test. The galvanometer yielded no result, the current being completely interrupted. The repetition of the same experiment yielded the same results.

So far chloroform acted in the same manner as alcohol, but when tested with water or brain pulp the results were naturally different. Such differences depend on the relative behaviours of alcohol and chloroform with water. Alcohol mixes uniformly with water, while chloroform with water does not. Five hundred parts of water will take up one part only of chloroform in two hundred parts so as to make a

mixture, and consequently with any larger proportion, chloroform acts as many other foreign substances do, playing its own part. It was requisite to test chloroform with water and afterwards with brain pulp.

OBS. LVIII. *Water and Chloroform.* A mixture was made of chloroform and water, the water being saturated with chloroform and constituting chloroform mixture. Five hundred grains of chloroform mixture were placed in the jar and connected with the battery and galvanometer. The needle diverged three degrees, showing that water gives power, to a limited extent. In this case some electrolysis was observed as the experiment proceeded.

OBS. LIX. *Brain Pulp and Chloroform.* Five hundred grains of brain pulp were put in the jar, and to them one per cent of chloroform was added and intimately mixed. On the battery being connected the galvanometer registered eleven degrees.

OBS. LX. *Brain Pulp and Chloroform.* Five hundred grains of brain pulp were placed in the glass jar, and there were added and intimately mixed two per cent of chloroform. When the battery was connected, in the usual manner, the galvanometer stood at nine and a half degrees.

These observations and others like them show that chloroform diffused through brain pulp, checks or impedes conduction; but beyond this more cannot now be said, as the chloroform itself seems to excite a special action on the nervous matter by which the results are strangely modified, the current sometimes rising, and sometimes falling, with differing proportions.

*PYROPHOROUS BLOOD AND PYROPHOROUS ACTION
IN THE TISSUES.*

IN the term pyrophorous I name something that has not before been used in regard to animated bodies, and yet has been known in regard to bodies inanimate. In the pure physical philosophy we have long been familiar with the word pyrophorous, and have understood what is meant by that word. It relates to any substance which would take fire on exposure to the air, and then burn with the emanation of light, and sometimes heat. I believe it was spoken of before the nature of it was understood, and was once employed in experimental kinds of work under the name of "Luft-zunder, or air-tinder." It was known as black phosphorus, a substance discovered in 1680 by M. Homberg, who, curiously enough, obtained it from human fæces mixed with alum. Afterwards Lemery came to the conclusion that fæces were not necessary, but that sugar, honey, flour, and almost any other animal or vegetable substance, might be used instead. It was also shown later by De Suvigny that even alum was not specially wanted, but might be replaced by any of the vitriolic salts. The chemists following the above theories were exceedingly minute in their descriptions of the mode of making a pyrophorous, in which art they sometimes calcinated a mixture of one part of wheat flour and three parts of burnt alum. The substance they obtained on being exposed to the air becoming warm went into flame.

The pyrophorous continued in use until the days of

Joseph Priestley, who was acquainted with it, after whom it came to be understood that pyrophorous was a substance containing an element that would, on exposure to air, rapidly absorb oxygen, and thereupon would pass into flame. On this discovery the pyrophorous was variously made, sometimes in the solid, sometimes in the liquid, sometimes in the gaseous form. But the most common form was the solid, and the powder usually employed was the sulphuret of potassium, although occasionally it was brought forward by lecturers in a still simpler shape—namely, as a very oxydisable metal, which remained unchanged so long as it was closed up in a glass tube, but which, diffused freely, took fire in the air. When it was presented in the fluid form, it consisted usually of phosphorous dissolved in a volatile liquid, like bisulphide of carbon, which, going off at a low temperature and at a proper tension, left the phosphorus on a wide surface, so that, exposed to air, it could oxydise into flame. When again it was presented in the gaseous form, one element of which was oxydisable, it was commonly called wildfire.

It occurred to me in the study of various phenomena caused by these experiments with a pyrophorous, that there was something in them which suggested the idea of various oxidising changes in the body, and especially in the blood. It is certain that blood, like some metals, seizes oxygen, and, by change of colour, not to name anything further here, burns and gives vapour of water. Ever since the days of Hooke these facts have been known. It has also been conceived, since the microscope has been so formally an instrument of research, that the red corpuscles of the blood hold something which has strong affinity for oxygen, carry the oxygen

required into the body at large, and, combining with the carbon, yield the animal heat generally, and furnish that carbonic acid gas which we find in the expired air. This was the common theory until I found, over twenty years ago, and demonstrated at the Liverpool Meeting of the British Association, that the corpuscles play a double part: that they not only preferentially seize, fix, and convey oxygen from the lungs into the body, but that they also seize, fix, and convey by the lungs out of the body the carbonic acid which is formed in the process of oxydation, the body, all over, giving it up to be replaced by oxygen. This led me to the idea that in its way blood has all the characteristics of a pyrophorous—that it seizes on the oxygen presented to it in the lungs, and conveys it to its destination.

If this suggestion is correct, what is the substance that plays the pyrophorous part, what in the corpuscles holds the gas that is required to be absorbed, and what is the absorbent element? In thinking over this it was obvious that the element first to be considered was phosphorus. This element seemed in itself to be everything that was wanted in the part to be played. Moreover, phosphorus is an element in and of an animal body. It enters into the body as a food; it is present in large quantities in the skeleton; it is excreted freely in the renal system; forms, in some structures, a certain portion of the coverings; and, altogether it is as necessary for structure as it is appropriate for action. That it should not have been largely and distinctly studied in respect to the body in health and disease could not be helped, but was one good reason why it should be studied, whatever the results might be, and I looked

upon water that might be present in a favourable rather than unfavourable light, remembering well an experiment of the late Professor Faraday, which showed that bright phosphorus commingled with perfectly dry air did not oxidise, but on the admission of water vapour the oxidation became almost dangerously severe.

Without adding further to these preliminary notes, I proceed to the record of experimental observations made upon them.

Obs. I. *Artificial Phosphate Envelope or Covering.*—Five hundred grains of albumen from white of egg were well admixed with an equal portion of neutralised solution of hydrogen peroxide of ten vol. strength. The mixture remained steady—that is to say, free from the escape of oxygen, as is the case when albumen is employed. The mixture was placed in an earthenware beaker and gently warmed to 105° Fahr. The upper surface of the solution was next very evenly and gently spread with a coating of fresh lime, and over the lime was equally distributed a fine layer of a solution of phosphorus in bisulphide of carbon. The whole was placed at a temperature of 105° Fahr. in an incubation cupboard, and there it was left so that the bisulphide solution might slowly evaporate and the phosphorus remain in contact with the lime. After a few hours the bisulphide did evaporate and the lime was seen to be in a glow, which was permitted to continue until it went out. The result was most interesting. A phosphate of lime covering was spread all over the albumen quite evenly, like the shell of an egg. This covering could be broken into small patches, which when lifted up and examined, were seen to be of the usual egg-shell character, breaking in the same brittle way and

presenting sharp edges. There was no membrane, strictly beneath to form a lining, but the albumen below was somewhat changed in structure. It was perfectly white, appeared of a puffy or springy look, and some of it adhered to the shell. When a patch of the shell was burned in an open flame it left, as egg-shell does, a carbon ash, and evolved a similar odour. In simple words, in this experiment we had performed the same phenomena as those that occur in the process of the natural manufacture of an egg. Phosphoric acid united with the lime, and a thin covering over the albumen was produced.

OBS. II. *Phosphorised Blood in a Bladder*.—One thousand grains of carbonised blood, to which was added five grains of slaked lime and one hundred grains of five per cent. phosphorus solution in bisulphide, were placed in a sheep's bladder, in which was inserted a thermometer and pipette tube. The bladder was then suspended in a ten vol. solution of peroxide of hydrogen. The thermometer stood at 61° Fahr. The temperature remained the same for five hours, and then fell six degrees. After this it was observed that the bladder underwent slight swelling, and the peritoneum, covering the bladder, became raised and stood out in a vesicular manner. The fluid within the bladder felt firm. On opening the bladder the mucous surface within presented a sanguineous, and it might almost be said an inflamed appearance, the mucous coat seeming very much thickened, and presenting an appearance as if covered with growths. When the fluid blood was allowed to flow into a dish from the inside of the bladder it was charged with bright globules, or vesicles, of the phosphorous bisulphide, each globule being surrounded with what seemed to be an oily, pale-

yellow, rim. At the bottom of the bladder there was a thin, granular kind of calculus containing lime, and evidently consisting of a combination of phosphorus, combined with some substance by which it was fixed, which gave it a calcareous appearance, surrounded by dark blood clots, and made it adherent to the membrane, with a whitish surface beneath. The appearance presented altogether was very remarkable, looking like the mucous membrane in a state of cystitis, with effused blood from the membrane itself, the said membrane raised, and a substance of a calcareous character deposited at the lowest part. The blood was thin, fluid, and dark, but quite fresh.

OBS. III. *Phosphorised Blood and Oxygen*.—A solution of phosphorus in bisulphide of carbon was made in the proportion of five grains of phosphorus in one hundred grains of bisulphide, and was labelled "the phosphorised solution." To five hundred grains of fresh blood, twenty grains of the phosphorised solution were added, that is to say one grain of phosphorus itself was diffused through the five hundred of blood. The mixture, as charged, was placed in a glass vessel and set in a sand bath at 102°, so that the bisulphide might evaporate. On the bath it was shaken frequently, and stood until all odour of the bisulphide had passed away. At this stage the blood mixture was placed in an incubator at 98° Fahr., and a thermometer that reached from it to the top, and could be read outside, remained at the same temperature (98° Fahr.) for several hours. Finally through a pipette passing by the side of the thermometer, thirty grains of a solution of neutralised oxygen peroxide of thirty-volume strength was slowly introduced. On this the thermometer rose from the 98° to 102°, and on the addition of thirty

grains more of the oxygen solution, it rose from 102° to 108°.

OBS. IV. *Blood and Oxygen*.—In order to strike a comparison with the above record, the same quantity of blood from the same source, but not phosphorised, was treated in precisely the same manner. On the first addition of oxygen to this blood the thermometer rose one degree, from 98° Fahr. to 99°, and on the second addition of the oxygen it rose just one-and-a-half degrees more.

The above experiments were performed with blood at the ordinary temperature of the day, and it was found to be the same relatively in result. We might infer from them that the admixture of phosphorus and blood leads to a rise of the thermometer. It might also be inferred that in fever there is an increase of heat owing to the presence of some substance in the blood which acts after the manner of a pyrophorus.

We must not, however, jump at such a serious conclusion, since it was observed that blood at different lines shows different temperatures when oxygen is being diffused through it. A rise in temperature is most marked when the bulb of the instrument is raised steadily towards the surface, but does not reach the distended or gaseous substance floating on the top, but which is itself always found to be higher in temperature than the solid and dark mass of blood that lies at the bottom.



ON THE TRANSMISSION OF LIGHT THROUGH ANIMAL BODIES.

T the present moment, when the scientific world is watching with deep interest the recent researches, especially that on the transmission of light through animal bodies, it seems to me worth while to refer to researches which I myself made twenty-eight years ago on a similar subject.

My paper on the matter was read at the meeting of the British Association for the Advancement of Science at the Norwich Meeting in 1868, and the report of the paper, in a condensed form, is published in the Transactions of the Society for that year, beginning at page 118. I reprint the report simply as it is recorded:—

“The author exhibited a lamp which he had constructed for transmitting light through the structures of the animal body. He believed the first idea that such transmission could be effected was given in Priestley’s works on Electricity. That great experimentalist, the Shakespeare of physical science, had observed on passing a discharge of a Leyden battery through his finger, that the structure seemed to present luminosity; but the operation was extremely painful. The author had repeated this experiment with similar results. Of late years research had been made with the microscope in the transparent web of the foot of the frog; and last year Dr. M’Intosh had shown that young trout could be used experimentally, they being sufficiently transparent for the investigation of the action of various poisonous substances on their

internal organs. The suggestion of Dr. M'Intosh had been acted upon by the author, and the motion of the heart and of the respiration had been observed by direct ocular demonstration while those organs were under the influence of various bodies belonging to the ethyl and methyl series. This research had led the author to extend the principle further; and he now advanced so far that he was enabled to transmit light through various tissues of the bodies of large animals. He had thought it was best to begin by testing each tissue separately; and this investigation had been carried out on nearly all the structures of the body which admit of being individually examined. The structure the most diaphanous was the skin; after that, and singularly enough, bone; then thick membranes; next, thin superficial muscles, lung tissue, fat and the dense tissues of the liver and the kidney. Various lights had been tried—viz., the electric, the oxyhydrogen, the lime-light, and the magnesium. For all practical purposes the magnesium light was the best; it was the most convenient to use, and the light had the advantage of penetrating deeply. In the lantern which the author exhibited the light was also unattended with heat at the point of observation, so that the hand could be put in at the brightest illuminating point. The lamp was made by Solomon of Red Lion Square. The additions consisted in a tubular arrangement and a sliding groove. The structure to be examined was placed in the groove inclosed between two discs of perforated wood, and the object was surveyed from the further end of the tube. In illustration, a thick piece of bone (the flat rib of an ox) was placed in the lantern, and light was distinctly transmitted through it. 'It was,' says the author, 'important to

speaking with care as to the extent to which this lantern could be used practically.' He did not consider it perfect, but thought it promised results of the greatest interest and value. In the first place it might be used for a variety of physiological purposes. Animals, whose tissues were thin, such as fish, could be placed in the lantern, and the condition of their circulation and respiration could be carefully studied under the action of various agents. In the human subject, especially in the young, having fragile tissues, the thinner parts of the body could be distinctly rendered transparent; and in a child the bones, under a somewhat subdued light, could be seen in the arm and wrist. A fracture in a bone could, in fact, be easily made out, or growth from bone in these parts. In a very thin young subject, the movements and outline of the heart could also be faintly seen in the chest; but the light he had as yet employed had not been sufficiently powerful to render this demonstration all he could desire. It would be possible, lastly, to see through some diseased structure, so as to ascertain whether, within a cavity, there was a fluid or a solid body. The author concluded by stating that his object had been rather to mark the origin of a new and progressive step than to explain a perfect instrument, or record an extended series of successful results."

When I concluded this address, which was much fuller than what is given above, it did occur to me as stated in the last paragraph that the rendering of portions of the body diaphanous, and the bringing into view other parts like bones which admitted the passage of light indifferently, and which in fact threw back light, and showed their own structure, would be a very distinct and important advance, and why it was not so

was exceedingly remarkable. It is interesting to observe, however, that the practical value of the research was not altogether lost, as in more than one person I was able to detect enlargement of bone, nodulations springing from bone, and, very distinctly, a fracture. I was also able to observe displacements of bone with correctness.

But the most interesting case of all had relation to stigmata. A medical friend, who has the superintendence of persons whose minds are not considered good, was consulted by a lady and her friends on a singular point. The lady had an idea that on frequent occasions she detected spots of blood in places where they ought not to be—on her pocket-handkerchief, on her serviette, on the table-cloth, and very frequently on the sheets of her bed. There could be no mistake about the spots, and it was inferred they came from one of her hands, although nothing could be detected. I put the hand in the light, and found a little plexus of blood-vessels about the size of a small pea, with an opening point leading to the skin. I marked the spot, laid the plexus freely open with the lancet-point, treated the wound with caustic alcohol, bound it firmly with an elastic band, and effected at once a perfect cure, physically and mentally.

I may add that bone is not always opaque and reflective, for more than once I passed light through a bone so that a mark could be seen through it.

COTEMPORARY PRACTICE AND LITERATURE.

“Every physician will and ought to make observations from his own experience ; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together.”—FREIND.

MY tables are swimming with books, and I really do not know which one to take up first. Perhaps it is well to turn to that which treats of an English Physician who was all the rage when I first remember physic—Sir Henry Halford.* The work has been written by the well-known Dr. William Munk, the Harveian Librarian of the Royal College of Physicians. It is a splendidly got-up volume of 684 pages, dealing with a man “who attained steadily, yet rapidly, and without any perceptible extraneous aid, the largest practice and most extensive reputation with the public, and maintained the longest supremacy with both—profession and public—that has been known in this country.” The object of the book is to perpetuate the knowledge of so distinguished a physician, scholar, and member of society, and to rescue Sir Henry Halford’s memory from the oblivion into which it has fallen.

* *The Life of Sir Henry Halford, Bart., F.R.S.*, by William Munk, M.D., F.S.A. Longmans, Green & Co. London, 1895.

There cannot be a doubt that Dr. Munk has done all that man or scholar can do to fulfil the purpose for which the book was written, and Halfordian friends and admirers will thank him with all their hearts. But it must be admitted that he has been compelled to descant on times that have long gone by, and of manners and customs, as well as men, that have long been out of sight and of mind. He, too, is so candid, that, even when he is doing his best, he is not quite depicting what he feels to be strong; he stands at the back of fortune rather than of philosophy, and he sometimes depicts, on direct evidence, things he had no desire to meet. Still, there is much in the work that reads charmingly. The letters of the great Duke of Wellington are capital bits of history, especially one that tells how the hero of a hundred fights had so far forgotten his Latin that he had to call in the aid of a scholar to write a speech for him; and another in which he explained to the Primate of Ireland that it was written, not by him, but for him. Others are in the same strain, and the story about the attendance on the King at Windsor, and on courtly and noble people, unveils the life of a man at the head of English society, and of whom we read earnestly, even if the lesson, in our days, be neither fruitful to the mind nor convincing to the soul.

The difficulties Halford encountered are well known, in his report of the case of Mr. Lockley, a much-respected medical practitioner living in Half Moon Street. Mr. Lockley, who seems to have been under Sir Henry's care, was invited by him to go to Wistow for change of air and scene. The two started for their destination on October 2nd, 1838. They entered a carriage at Euston Square Station in the morning.

Whilst in the square Mr. Lockley fell. He said he fell by mere accident; but as they passed Watford, Mr. Lockley became sick, and at Tring Sir Henry took him, probably insensible, out of the carriage, laid him in the waiting-room, sent for Mr. Dewsbury of Tring, or his assistant, and then pursued his journey. Mr. Dewsbury came, bled the patient, informed his friends, and, with the assent of Dr. Watson, sent him to London on the 6th, where he died twelve days after the first seizure. One rumour has it that Sir Henry, being a physician, funk'd bleeding Mr. Lockley. Another rumour says that if Mr. Lockley had been a Prince, a Duke, or a Lord, the medical Baronet, though he might not have drawn blood, would not have left him to his fate. The second rumour is, doubtless, most correct; but this is still a world of flunkeyism, and was worse so half a century ago.

*THE LAW AND CHEMISTRY OF FOOD AND DRUGS.**



VERY handy octavo volume has been published by Mr. Rebman, of Adam Street, on the above subject. The authors of the book are Dr. H. Mansfield Robinson and Mr. Cecil H. Cribb. They write in order to provide in a convenient compass a practical manual dealing with both the law and chemistry of the subject, to some extent necessary in the conduct of cases before the courts.

To meet the needs of lawyers and public officials the exact text of the statutes is given, with references, to decide cases and authoritative chemical works; while

* *The Law and Chemistry of Food and Drugs*, by H. Mansfield Robinson, LL.D., and Cecil H. Cribb, B.Sc. London: Rebman, 1895.

special chapters are devoted to practical hints for enabling the public to protect themselves, and for keeping honest vendors from committing offences against the law.

One of the most interesting chapters is that on tea, p. 457, *et seq.* The price of tea is given at from 1s. to 3s. per lb., and upwards. The culture and mode of preparation is given, the gathering of the crops, and the picking of the leaves. In the green tea the leaves are spread out for an hour or two, then thrown into heated pans and kept in constant motion for four or five minutes, after which they are removed, rolled with the hands, and returned to the pans for an hour or more, by which time they are thoroughly dry, and the colour, a dull green, is not likely to change to black.

In the black tea the leaves are spread out for eight or eleven hours ; they are then well spread out and left for an hour or more ; they are next rolled into balls, are then compressed to liberate the juices, and, being speedily dried, are exposed to the air again until they are of a dark colour. The preparation of the leaves, the chemical composition, the facing of the leaves, the detection of adulterants, and the modes of infusing and making for the table are described.

Tea affords a fair specimen of the facts recorded, but there is not an article commonly used as food that does not come before us in a similar way, and there is not a housewife or a cook who will not be instructed in some part of the volume, which is, in fact, a household book.

NOTES FOR NURSES.*

THE previous editions of this little book have speedily passed through the press; and no wonder, for the work is not only cheap in price but is of the most excellent character. It consists of notes, which the learned observant and industrious author of it has delivered to the Nursing staff of the Edinburgh Royal Infirmary for twelve years past; and, although it professes to deal with surgical patients only, may be considered as applicable to medical as well as to surgical nurses. The last lecture in the book, on "General advice to nurses," does indeed include facts that should be stored up by the nursing attendant, whether she be at the surgical or medical bedside. The last point insisted on in this chapter seems to be golden in its advice: "Cultivate absolute accuracy in observation and truthfulness in support. It is not so easy to be accurate as you think, but it is at times of great importance. Temperatures, for example: if you forget to take one, and mark it down just before the doctor comes, you may be deceiving him, to the patient's hurt. Far better answer at random, "I don't know them," when asked about some symptoms you might have noticed. But inaccuracy is venial and common to many of us. Untruthfulness, intentional inaccuracy, is a mortal sin." The author could not possibly have closed with firmer advice, and the specimen given is the tone that is proffered in many other places and under different heads.

* *Notes on Surgery for Nurses.* By Joseph Bell, M.D., F.R.C.S.E. Oliver Boyd & Co., Edinburgh. Fourth Edition, Revised, 1895.

*THE EVOLUTION OF HEALTH PROTECTION.**

THE title of this book is singularly happy, and the matter is as good as the title. Dr. Russell has been in command of a grand field of observation, and has nobly availed himself of his opportunities. For my own part, I look at Glasgow during the whole of the years named in this volume, and I willingly confirm every line of the story that is here told. Fifty years ago Glasgow was a sad city in relation to health and its management. The city from comparative obscurity developed faster than it ought to have done in the way of population and commerce. There were too many people for the houses, excepting always the public houses, and much overcrowding everywhere. The wonder was that people lived as they did in many places, and recovered from the many maladies with which they were smitten. Dr. Russell is not blind to these painful and fatal pictures; and he delineates in his calm, slow, and masterly manner, how reforms have been introduced, and an old centre of positive evil has been systematically transformed into a comparative region of light and life. The best of all tests of improvements is rendered in his remarks of the "death rates" beginning at page 50 and extending for several pages farther; but the pith of all is given in the following words: "If we divide the whole balance of gain into two, we find that it amounts to 4019 lives per million saved from the tribute formerly levied by Zymotic diseases, and 2856 from the tribute of all other diseases; or 58 per cent. for the total saving from the former, and 42 per cent. from the latter."

* *The Evolution of the Protection of Public Health Administration as illustrated by the Sanitary History of Glasgow in the Nineteenth Century.* By Dr. J. B. Russell. Glasgow, W. Hodge & Co., 1895.

The results specified cheer the sanitary reformer beyond all expectation. He knows he has not lived in vain, but that his work has been one of the highest triumphs of the century. "Let Glasgow flourish."

UNIVERSAL MEDICAL SCIENCE.*

THE five volumes of this series have been published as usual, and give under the skilful direction of Dr. Sajous and his fellow collaborateurs all the facts of medicine of the past year. It is quite impossible to present any analysis of this great work, which is one of the wonders of our day; and every practitioner who has it possesses a current medical library that is without parallel.

* *A Yearly Report of the progress of the General Sanitary Sciences throughout the world.* Edited by C. G. Sajous, M.D., and seventy associate editors. New York, The Davis Company. London, Rebman.

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In order to prevent the frequent and troublesome mistake of addressing communications to the "Editor," it is necessary to repeat that everything published in the ASCLEPIAD is exclusively by the Author whose name is on the title-page.

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The Author will be greatly obliged if senders of Newspapers and Magazines would kindly mark the passages to which they wish to direct his attention.

4th
Quarter,



1894-5.

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